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THE TRAGEDY OF
PELÉE



GEORGE KENNAN

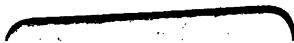
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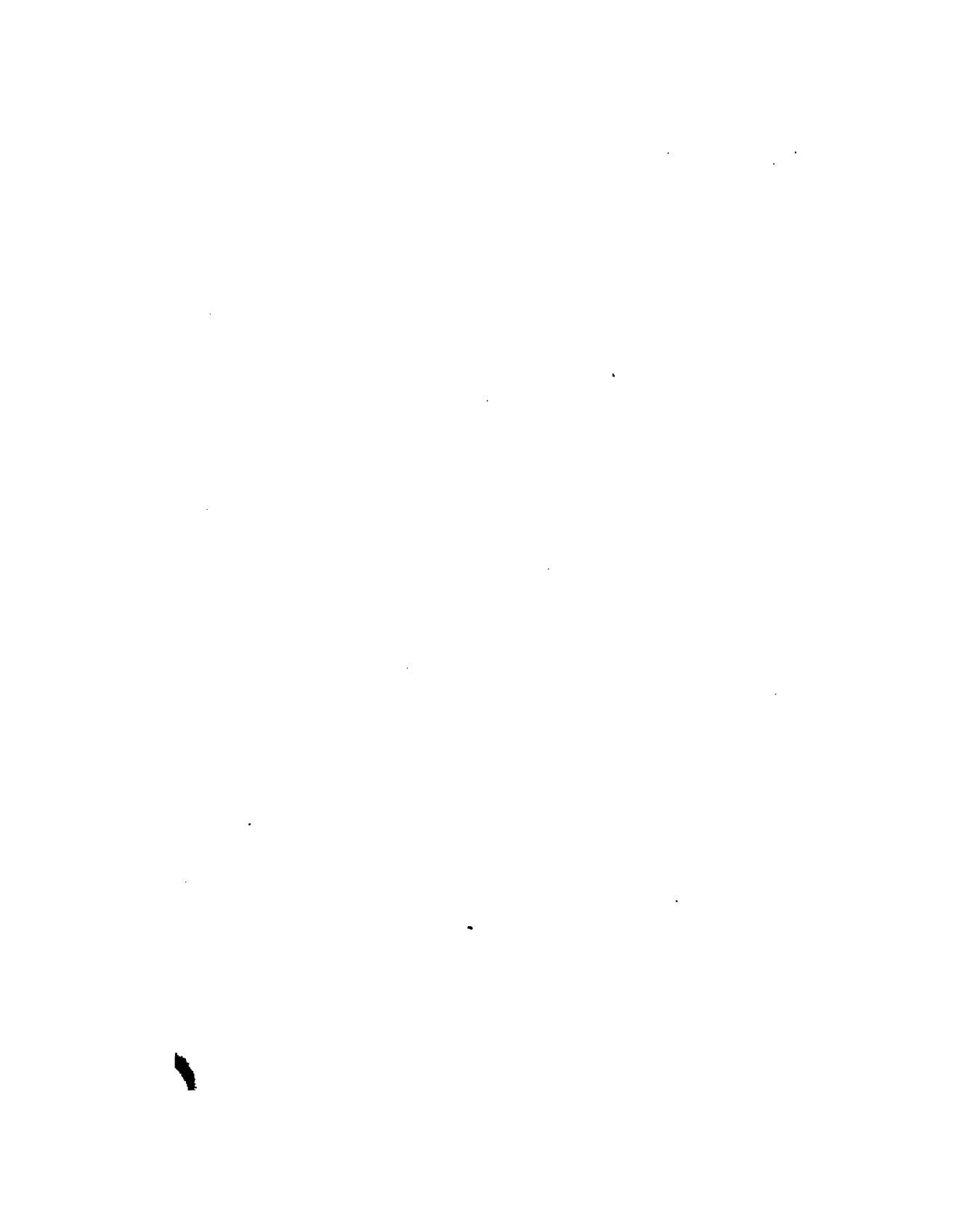


LELAND STANFORD JUNIOR UNIVERSITY



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THE
TRAGEDY OF
PELÉE







THE NIGHT ERUPTION OF MAY 26 FROM THE ROAD GOING
SOUTH FROM VIVÉ TOWARD ACIER

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THE
TRAGEDY OF
PELÉE

*A NARRATIVE OF PERSONAL EXPERI-
ENCE AND OBSERVATION
IN MARTINIQUE*

BY
GEORGE KENNAN

ILLUSTRATED
WITH DRAWINGS BY GEORGE VARIAN
AND PHOTOGRAPHS BY THE AUTHOR

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THE
TRAGEDY OF
PELÉE

1

I
THE VOYAGE TO MAR-
TINIQUE

ON the 8th of May, 1902, the captain of the French cruiser Suchet cabled from Fort de France to the Minister of Marine in Paris that the city of St. Pierre, Martinique, had been completely destroyed by an eruption of the volcano Mont Pelée ; that all, or nearly all, of its inhabitants had perished ; and that thousands of people in the northern part of the Island, who had fled in terror from their homes, were in urgent need of food and help. As soon as the first reports of the great catastrophe had been confirmed, the Government and the people of the United States took energetic measures for the relief of the homeless and suffering survivors. The Secretary of the Navy, by di-



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rection of the President, ordered to Martinique the cruiser *Cincinnati* from Santo Domingo and the tug *Potomac* from Porto Rico ; the Secretary of State directed Louis H. Ayme, United States counsel at Pointe à Pitre, Guadeloupe, to proceed at once to Fort de France and ascertain the extent of the disaster ; Congress made an appropriation of \$200,000 for the purchase of food ; and the cruiser *Dixie*, Captain Berry, was ordered to prepare for sea and sail for Martinique at the earliest moment possible, with such relief supplies as could be hastily bought and collected.

On the 13th of May, The Outlook telegraphed me " Can you go to Martinique on the *Dixie* ? " I replied that I could, and having obtained through the courtesy of the President, an order from the Secretary of the Navy for transportation, I left Washington for New York on the midnight train. After half a day spent in obtaining a tropical outfit, which was by no means satisfactory or complete, but which there was no time to make better, I went on board the *Dixie*, Wednesday afternoon, May 14, and found her decks crowded with army officers, newspaper men

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and scientists, all bound for the scene of the disaster. Among those who I knew, personally or by reputation, were Professors Russell and Jaggar, of Ann Arbor and Cambridge; Mr. Robert T. Hill of the U. S. Geological Survey; Dr. E. O. Hovey of the New York Museum of Natural History; Mr. C. E. Borchgrevink of Antarctic fame; and Mr. A. F. Jaccaci of McClure's Magazine. Besides these there were two French gentlemen who had friends of financial interests in Martinique; half a dozen army officers and surgeons; as many more non-commissioned officers and men from the Commissary Department and Hospital Corps; and finally the representatives of twenty-two newspapers, press associations and magazines. How all of these forty-four passengers were to be taken to Martinique on a warship that had no passenger accommodations whatever, I could not quite see; but I was fully prepared, myself, to sleep on deck and eat with the bluejackets, if necessary, and I presumed that most, if not all, of the army officers, scientists and newspaper men, had been accustomed to roughing it, and would accommodate themselves

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to circumstances with cheerfulness and philosophic equanimity.

It was supposed that the Dixie would sail at four o'clock Wednesday afternoon ; but at eight o'clock in the evening relief supplies were still being hoisted aboard, and we did not finally get away until half-past nine. Two hours later we passed Sandy Hook, and the revolving search-light on the Navesink Highlands waved a good-bye to us as we steamed out to sea in the darkness and laid a course for Martinique by way of the Anegada Passage.

The next two or three days were mainly spent in getting acquainted with one another and with our new and unfamiliar environment. Most of us were assigned to quarters below, on the after berth-deck, and slept in hammocks slung so closely together that the rather dark and gloomy space under the after hatch looked like a crowded hospital ward, with white canvas hammocks in place of cot beds. The officers of the Dixie tried in every possible way to make us all comfortable ; but the best that could be done, so far as sleeping accommodations were concerned, was to

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every man a hammock and twelve square feet of floor-space on the berth-deck under the hatch. Most of us, however, had no hammocks before, and, apart from the inconvenience of having no place to put towels, shaving implements, and other things in daily use, we were fairly comfortable. Those who had neglected in New York to provide themselves with portable mirrors were compelled to shave themselves by the aid of reflections of their sunburned faces in the bright bottom of a new tin pail ; but they had to develop skill and ingenuity. The atmosphere of " News-Room " was pervaded by a strong odor of concentrated codfish from the hold under the hatch ; but Mr. Fife, of the " New York Evening Post," who was not always able to sit at the ward-room table, declared that even in its disadvantages, inasmuch as it enabled him to get his daily quota of codfish, that he should otherwise miss. The Americans, to whom inhaled food was more objectionable, breathed it under protest, and we all consoled ourselves with sympathetic

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anticipation of the joy that that codfish was going to carry to the hungry volcano victims of Martinique. If the trade-winds would only blow in the right direction, our coming would be heralded in advance by an ancient and fishlike smell. The codfish, however, troubled us only at night. We spent our days, for the most part, in steamer chairs, under canvas awnings on the quarter-deck; some experimenting with photographic cameras; some reading volcano literature, from "The Last Days of Pompeii" to Brigham's "Text-Book of Geology;" some playing chess on the ship's big board with Brobdingnagian chessmen of iron and bronze, and a few teasing "General Weyler," the ship's monkey, by showing him an empty glove, of which he had an extraordinary fear, and then placating him with beer, which he drank out of the bottle with as much skill and gusto as if he had been accustomed to find bottles of beer growing on cocoanut trees in his native jungles.

In the evening a dozen of the younger officers and newspaper men used to get together in a sheltered place on the quarter

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deck with banjos and guitars, and the soft, steady trade-winds carried away to leeward the words and music of Kipling's "On the Road to Mandalay," or the land-lubber's song,

O Mr. Captain, stop the ship!
I want to get off and walk.

Still later in the evening, two of our most distinguished volcano experts would play ping-pong on the ward-room table, while the rest of us stood around, criticising the "serving," and catching erratic balls that seemed likely to go overboard through the cabin door. Sometime before midnight we all went below, put on our pajamas, climbed (with difficulty) into our swaying hammocks, imagined that we were in the forecastle of a cod-fishing schooner on the Grand Banks, and—with some co-operation from the snorers—dreamed of volcanic eruptions and Krakatoa catastrophes until morning.

Voyages in unfrequented seas are almost proverbially tiresome and monotonous; but volcano-hunting in the tropics on a United States cruiser, with half a dozen scientists and fifteen or twenty bright, fun-loving newspaper

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men, is a far from uninteresting occupation. Man-of-war life, in itself, with its morning and evening band-music, its gun drills, fire drills, and "setting-up drills" for the bluejackets and marines, is much more entertaining than the life of a transatlantic passenger steamer ; and when to these are added daily lectures on deck, stories of adventure and descriptions of travel given in the ward-room by men who have been in all parts of the world, discussions of volcanic phenomena by scientific experts from Washington, Cambridge, and Ann Arbor, and rag-time "coon songs" with banjo and guitar accompaniment on the after deck in the soft tropical moonlight, the time passes pleasantly and rapidly.

Friday afternoon, Mr. Borchgrevink, the Antarctic explorer, gave a lecture on the fore-castle to a crowd of bluejackets, marines, officers, scientists, and newspaper men ; Saturday we had a lecture from Dr. Hill, of the Geological Survey, on the structure of the earth ; Sunday I tried to intimidate the thermometer and lower the temperature by giving the men a talk on winter travel in Arctic Russia ; and Monday Professor Rus-

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sell, of Ann Arbor, explained volcanic phenomena and described a night spent under 125 feet of snow in the crater of the extinct volcano Mount Rainier, where the rocks are still warm enough to melt great caves under the snow-cap, and where the mountain-climber may warm himself beside a jet of hot steam under a snowy roof 125 feet in thickness.

The journalists, in order not to be outdone by the scientists and lecturers, organized themselves into a society to be known as "The Volcano Volunteers," and began the publication of a semi-occasional newspaper entitled "The Dixie." It was typewritten and had a circulation of only three copies; but its advertisements, personals, local items and marconigrams were things of joy, and nothing but the lack of press and postal facilities prevented it from becoming the most popular, widely read and influential journal in the whole Sargasso Sea.

We entered the Caribbean by way of the Anegada Passage, on the morning of Tuesday, May 20. When I went on deck at six o'clock, the sun had just risen in an unclouded

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sky and we were steaming swiftly, over a tranquil sea of luminous light-indigo blue, toward the high, precipitous, cloud-capped island of Saba — the first of the long chain of volcanic peaks that stretches across the eastern end of the Caribbean from north latitude 18° almost to the coast of South America.

Tropical islands, at first sight, are generally disappointing in color, if not in form. The exquisite rich luminous blue of the sea leads one to expect a corresponding vividness and freshness of green in the land; and when the misty silhouette of a mountain peak ahead loses, gradually, the tender atmospheric purple of distance and begins to assume its own natural inherent color, one is surprised and disappointed to find that its salient slopes, if not cultivated, have a rusty, semi-arid appearance, and that its vegetation, although green, is comparatively dark, dull, and lifeless. The hills of Nova Scotia, or the islands in the English Channel, when seen in June at a distance of five or six miles, are much brighter and fresher, and have far greater variety in their tints and shades of green, than any islands I have ever seen in the West In-

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dies. Tropical foliage is extremely beautiful and varied in form when seen in detail and at short range; but in mass and at a distance it is disappointing.

In massive ruggedness and grandeur of outline, however, the splendid volcanic peaks of the lesser Antilles leave nothing to be desired. The island of Saba, moreover, has an interest of its own not dependent upon color or form. It is an extinct volcano — or a volcano supposed to be extinct — and nearly all of its inhabitants live high above the sea in the shallow, saucer-like bed of its ancient crater. There are a few red-roofed houses scattered here and there in sheltered ravines on its northern slope; but the only village on the island is situated in the volcano's choked-up throat. The Dutch colonists in this high-crater village must have had some anxious days and nights when Mont Pelée and the Soufrière of St. Vincent burst into smoke and flame in the early part of May. The inhabitants of St. Pierre, living at a distance of more than four miles from the summit of Mont Pelée, had a chance, at least, of escape; but if the subterranean disturbance had ex-

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tended to the northern islands of the Windward group there would have been no hope for the people living in the crater of Saba.

The principal industries of this rugged, precipitous island have always been the building of boats and the ornamentation of linen by means of what is known as "drawn-work." Although Saba has neither harbor nor beach, its inhabitants managed to build boats on the high mountain slopes and launched them over precipices by means of chains and cables. For many years the fishing boats of Saba were regarded as the best to be had in the Caribbean; and the drawn-work of the Saba women, which is still offered for sale in St. Thomas and Guadeloupe, is fully equal to the Mexican product and is surpassed only by that of Russia. There is no other island, perhaps, on the globe, whose inhabitants live in the crater of an extinct volcano and support themselves, at least in part, by building boats on the tops of precipices and making drawn-work out of materials imported from Europe.

As soon as we entered the Caribbean, we began to look for signs of volcanic activity;

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but, with the exception of what seemed to be an intermittent jet of steam in a bare spot half-way up the steep western slope of Saba, we saw nothing to indicate that there was a volcano within a thousand miles. The second great eruption of Mont Pelée was in progress when I went on deck that very morning, and the detonations that accompanied it were certainly heard at Guadeloupe, and were probably audible at St. Kitts and Santa Cruz ; but we did not notice any unusual sounds, nor could we see the faintest indication of volcanic dust in the air. The sea was tranquil and the atmosphere clear all day, as we steamed southward past Saba, St. Kitts, Montserrat, and Gaudeloupe ; and when the "Volcanco Volunteers" climbed into their hammocks on the after berth-deck of the Dixie at eleven o'clock that night, there was a general feeling of disappointment, due to a fear that Mont Pelée had lapsed into quiescence and that we should arrive too late to see anything like a spectacular eruption.

We expected to make the northwestern coast of Martinique before daylight Wednes-

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day morning, and at four o'clock a few of us were on deck watching eagerly for the first indication of volcanic activity. It was a clear, warm, starry night, and by the light of a nearly full moon, which was just setting, we could dimly make out ahead the faint shadowy outline of a high, beautifully sculptured peak which we took at first sight to be Pelée. Mr. Hill, however, who had visited Martinique before and was more familiar than the rest of us with the topography of the island, soon identified it as one of the peaks of the Carbet group, situated just south of Pelée. The volcano itself, as we soon discovered, was hidden from base to summit in a mantle of dark vapor, above which, against the starry sky, rose to a height of two or three thousand feet, a huge column of steam which looked in the moonlight like one of the piled-up cumulus clouds locally known in the Middle West as "thunderheads."

Near the line where the black mantle of Pelée met the sea, there were two glowing fires, which we thought, at first, might be cremation fires in the wrecked city of St. Pierre, and a little farther to the northward

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three or four twinkling lights marked the site of Prêcheur. With these exceptions the whole coast was dark. As the yellowish moon sank lower and lower in the west and the sky began to brighten behind the cloud-capped peaks of Carbet, we ran in at a sharp angle toward the harbor of Fort de France until the fires of St. Pierre and the great mantle of dark vapor that hid the outline of Pelée vanished behind one of the high butresses of the mountainous coast. We could still see, however, the column of steam rising from the volcano's crater and slowly piling itself up in vast convolutions above the light trade-wind clouds which drifted westward across the island.

Between six and seven o'clock the Dixie steamed slowly into the harbor of Fort de France, where we found lying at anchor the Cincinnati, the Potomac, the French cruiser Suchet, the repair-steamer of the French Cable Company, and three or four other vessels. An officer from the Cincinnati soon came alongside in a steam-launch, and shouted to Captain Berry that he had a telegram for him from Washington, and that the Dixie would

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probably have to go at once to St. Vincent, where the suffering and destitution were worse, and the need of relief greater, than in any part of Martinique.

The newspaper men and scientists thereupon held consultations, in all parts of the ship, with regard to the best course of procedure. Should they go to St. Vincent with Captain Berry, or land at Fort de France and take the chance of being picked up by the Dixie on her return trip? Most of them decided in favor of St. Vincent, but Mr. Jaccaci, Mr. Varian, and I concluded to remain in Martinique and make as careful a study as possible of St. Pierre and Mont Pelée. We landed, therefore, in one of the ship's boats, soon after breakfast; made the acquaintance of Mr. Ayme, United States Consul at Pointe à Pitre, Guadeloupe, who was then acting as Consul in Martinique; and with his assistance succeeded in getting rooms in the Grand European Hotel, a three-story building fronting on the Savane, or public square, near the piers. After discussing the situation and exchanging items of news with Mr. Ayme, Mr. Jaccaci and I went out to take

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a walk, buy a few things that we wanted, and inspect the city.

Fort de France, the capital of Martinique, is a town of about 16,000 inhabitants, and is situated on the northern side of the bay of the same name, under the shelter of rather high, rounded hills. As seen from the water, it is a compact mass of red roofs and dark-green foliage, standing on very low, flat ground, between the mouth of the Rivière Madame and the massive gray walls of an ancient and apparently dismantled fort. Its buildings, which are generally two or three stories in height, are made of kalsomined brick, or rubble masonry covered with stucco; its streets, although narrow, are clean and well-paved; little streams of clear water from the hills run constantly through the open gutters; and the Savane, or public square, which borders the sea just north of the fort, is a fine, grassy park 1,000 feet long and 600 feet in width, intersected by walks and shaded by sandbox trees, tamarinds and royal palms. A large, well-ventilated iron building, about midway between the Grand Hotel and the Rivière Madame, shelters the central market;

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there is a good public library in a large house fronting on the Savane; the marble statue of the Empress Josephine, which stands in a circle of royal palms near the centre of the park, is a really creditable work of art; and at the head of one of the principal streets, just north of the Rivière Madame, the Fontaine de Gueydon rushes out of the arched mouth of a big stone aqueduct on the summit of a steep hill, falls in a thin, silvery sheet to a circular basin below, and then runs in a dozen little streams through the city.

The population of Fort de France, as seen on the water front and in the main streets, is made up almost wholly of negroes, mulattoes, quadroons, and ethnological hybrids of one sort or another, whose complexions range from the pure black of the unmodified African to the swarthy white of the French octoroon and the rather delicate reddish-brown of the "capresse." All the women wear turbans made of bright-colored bandanna kerchiefs; most of the men go bare-footed and at least two persons out of every five carry loads on their heads in baskets, bundles,



THE ERUPTION OF MAY 28 FROM ACIER

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or shallow wooden trays. Here and there we met a French gentleman in white duck clothes and pith helmet, going down to the pier ; two or three young naval officers in uniform who had just come ashore from the cruiser Suchet ; or a lady in light European dress on her way to church ; but four-fifths of the people whom we saw on the streets were either black or of mixed blood. They seemed, however, to be talkative, good-humored, courteous and fairly intelligent, and made upon me, generally, a more favorable impression than that made by the common people of Spanish-African descent in Cuba.

The favorite place of resort for the Frenchmen of the town seemed to be the open kiosk at the edge of the Savane in front of our hotel. There, gentlemen of leisure and white-uniformed officers from the Suchet assembled every afternoon and evening to play cards, smoke cigarettes, talk about the volcano, and sip queer West Indian drinks. I thought I was familiar with most of the cooling, heating, refreshing and inebriating beverages known to civilized man ; but the

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waiters of Bediat's Hotel, who answered calls from tables in the kiosk, compounded in a big glass cylinder and mixed by means of a perforated piston a drink that I wholly failed to recognize. It looked like chocolate, churned into a foam by working a piston up and down through it in a glass garden-syringe. Upon making inquiries, I learned that it was a cocktail! As I had never seen a cocktail made in that way, and as I was hot and tired from walking about the town, I ventured to order one. I don't know of what ingredients that chocolate-colored beverage was composed; but I decided, after tasting it, that I should make no more experiments with drinks mixed in a glass hand-churn, and that a plain lemonade with a straw in it would thenceforth meet all my wants.

But the Grand Hotel de Bediat was as queer as the drinks that are furnished. Breakfast, or luncheon, was served at 11 A. M. Negro waiters, who wore nothing but shirts and trousers, brought food to the guests at small tables, and put more food, for the dogs of the guests, into plates on the floor. The dogs

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and cats of the hotel, who were apparently familiar with this custom, endeavored to get a share of the food furnished to the guest-dogs, and the result was a general and promiscuous scrimmage, which, with the joyous crowing of three or four big roosters in a wire coop just off the dining-room, furnished, in a simple form, all the comforts of home, which were charged as extras in the bill. I was told by Mr. Ayme that none of the explosions of Mont Pelée were heard in this hotel. If they occurred at meal-time, the fact is not surprising. Mr. Bediat's combination of dogs, cats and roosters would have drowned Krakatoa. Dinner, which was usually served at 7 P. M., was a more quiet and ceremonious function, owing to the fact that the roosters had gone to roost and were not yet ready to begin crowing for morning, and the guests with dogs happened to be dining somewhere else. The table d'hôte dinner consisted of soup made out of warm water and toast ; fish brought from the Grand Banks in a sailing vessel, which, unfortunately, had no cold-storage facilities ; a dismembered rooster, dried over a charcoal-brazier after advancing

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age had rendered him incapable of crowing in the hotel coop ; green peas cooked in oil ; ice cream flavored with bergamot and served in brandy-glasses ; cheese, coffee and tooth-picks. The cheese and the coffee were good ; and after I had gone to my room and mixed for myself a stiff drink of malted milk and Vichy water, I felt quite strengthened and refreshed by the dinner. Mr. Ayme, however, who had an inherited objection to fish that was more than six weeks old, rebelled at the second course, summoned the proprietor and filed a protest ; but Mr. Bediat called all the saints of Martinique to bear witness that the fish had not been brought from the Grand Banks in a dismasted schooner, but had been carefully selected by a District Messenger boy, aged six, in the local market. He admitted, however, that the second course was a little weak, and promised to make a suitable abatement in the price of the dinner. Then, when we had a guest at breakfast the next morning, he covered the loss on the fish by charging the guest's breakfast in three separate accounts—Mr. Ayme's, Mr. Jacaci's and mine. Mr. Ayme was probably too

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fastidious, and too much inclined to give a free rein to his appetite ; and if he had been living elsewhere, he might have become corpulent and sluggish. It is a great mistake to eat too much in a hot climate ; and for that reason I can confidently recommend the Grand European Hotel at Fort de France as a place where a northern man may hope to escape the disastrous consequences of intensive nutrition in a tropical environment. If he lives prudently, and doesn't have the misfortune to get overheated when Mr. Bediat presents his bill, he will never die of apoplexy in Martinique.

Mr. Jaccaci and I spent most of Wednesday afternoon in getting statements of personal experience from sailors of the steamer Roraima and other survivors of the St. Pierre catastrophe, who were then recovering from their frightful burns in the Military Hospital.

Thursday we made a hasty trip to St. Pierre on the United States tug Potomac, and, after examining the desolate, gashed, furrowed, steam-rent slope of the volcano on that side, decided to adopt a plan suggested by Mr. Jaccaci, which was to proceed north-

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ward by way of the eastern coast, and attack the volcano from the windward side.

There seemed to be no reasonably safe base of operations on the St. Pierre slope, but by establishing our headquarters at some sugar plantation near the foot of Pelée on the opposite side we could probably reach Morne Rouge, which was only three miles south of the main crater, and from there it might be practicable to make an ascent. At any rate, we should escape the smoke and suffocating vapor that rolled at intervals down the hot mud-fields between St. Pierre and Prêcheur, and the showers of ashes that the steady trade-wind carried westward over the Caribbean coast.

At eleven o'clock Thursday night Mr. Jac-caci came to my room to tell me that horses had been ordered for 5 A. M., and that as soon as possible thereafter we should start for the volcano by way of Trinité, Marigot, and Grande Anse.

II
OUR RIDE TO MONT
PELÉE

ALTHOUGH the servants in Bediat's Hotel had been strictly enjoined to get us up at four o'clock, and a carriage with a span of mules had been ordered for five, we were allowed to sleep peacefully until a quarter of six, when the increasing light and the crowing of cocks in the hotel courtyard made it impossible for anyone but a native to sleep longer. From the point of view of the proprietor it was unreasonable, of course, to order or expect breakfast in a Martinique hotel at 6 A. M. The servants did not begin to clear the tables in the dining-room and wash the dishes left there from the previous night's dinner until seven, and the regular hour for breakfast was eleven. We proceeded, there-

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fore, to get breakfast for ourselves on a bare, dirty table in the bar-room. We had taken the precaution to bring a small quantity of elementary nutriment ashore with us from the Dixie; and as we munched dry hardtack and drank malted milk mixed with Vichy water over that dirty bar-room table, we felt as if we had reason to congratulate ourselves upon our prevision, if not our provision. Hardtack and slab-chocolate, eaten in alternate bites and washed down with a mixture of malted-milk powder and tepid Vichy water, make a fine, wholesome breakfast—for the tropics.

After breakfast, Mr. Jaccaci had to go in search of the carriage and mules, and from the volcanic expression of his face when he left the bar-room I felt sure that the tardy driver would shortly be overwhelmed by a verbal eruption in several languages—and he was! We got under way at last, and rolling past the Savane, with its mango-trees, tamarinds and palm-encircled statue of Josephine, we began the ascent of the long, flower-fringed road which leads up to Fort Désaix, and thence, across mountains and valleys innumerable, to the eastern coast of the island at Trinité.

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Before we were fairly out of the city we began to meet long lines, or single files, of barefooted negro women, in turbans and bright-colored calico gowns, carrying on their heads shallow wooden trays piled high with mangoes, pineapples, green cocoanuts, bananas, sweet potatoes, yams, manioc roots, and other fruits and vegetables for the Fort de France market. Most of these women and girls had risen before daylight and come in from distances of ten or twelve miles with loads weighing from thirty to fifty pounds; but they walked swiftly, with a long, easy, elastic stride, and showed no signs whatever of suffering from heat, breathlessness, or fatigue.

The heights above Fort de France are occupied largely by suburban villas; and for twenty minutes or half an hour we rode between front yards and gardens filled with beautiful flowering trees or shrubs, and bordered along the road by high hedges of oleander and hibiscus bushes, whose brilliant blossoms of pink or crimson shone vividly, like spots of fire, in a dark, dew-wet tangle of moonflower and morning-glory vines. Of

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the villas that stood behind these hedges and gardens we could see little or nothing. They were buried in masses of foliage and bloom.

As we passed the gate of Fort Désaix, near the top of the hill, we met a squad of French buglers, who were marching slowly and solemnly around the outside of the fort, tooting in unison what I presumed to be the Martinique reveille.

Emerging at last from the narrow, winding, flower-bordered road and reaching the crest of the great divide that separates the Rivière Monsieur from the Rivière Madame, we looked out over a wonderfully beautiful panorama of wooded foothills, deep misty valleys, sunlit plains, and shimmering water, that seemed to extend from the cloud-capped peaks of Carbet on the north to the low purple mountains that bound the Bay of Fort de France on the south. An extensive tract of level land, covered with sugar-cane, could be seen near the head of the bay, but everywhere else the island was a billowy sea of mountains, with here and there the glimmer of a stream, a few patchwork squares of cultivation, or a cluster of red-roofed houses to

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light up the deep, shadowy valleys or break the dark green masses of foliage on the forested slopes. Over the crests of these huge green mountain billows and down into the valleys that separated them ran the white macadamized road in a series of long loops and curves, now sweeping in deep shadow around the head of a wild ravine and crossing a foaming torrent on a stone bridge, then climbing a long, smooth grade to the crest of a sunny divide, then plunging into a dark valley where the horizon-line was a silhouette of palms against the sky a thousand feet overhead, and finally doubling on itself in a narrow horseshoe curve and ascending to a breezy *morne*, or dome-shaped mound, from which we could see the ocean, the bay, and almost the whole southern half of the island. The road was so sinuous, and changed direction so rapidly, that even with the aid of the sun and the steady trade-wind it was almost impossible to keep ourselves accurately oriented. In the course of a short half-hour that road would run north, south, east and west by turns ; and when, upon coming up out of a deep ravine, we looked ahead for the

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peaks of Carbet, we were sure to find ourselves facing in the opposite direction, with the peaks at our backs. Two or three times at least I mistook the Bay of Fort de France for the ocean on the other side of the island, and prominent landmarks seemed to be constantly shifting from place to place, as if some superhuman power rearranged them every time we went down into a deep valley and lost sight of them. The highways in Martinique are almost as smooth and perfect as roads can be made; but their loops and curves are as eccentric as the tracings of a seismograph in a Lisbon earthquake.

An hour and a half from Fort de France we passed at a short distance the picturesque village of St. Joseph; two hours later we watered our mules in a little hamlet half-way across the island; and just before noon, from the eastern slope of a great mountain dome known as Gros Morne, we caught sight of the Atlantic.

After leaving the Gros Morne we began to meet long lines of women and girls carrying roofing-tiles from Trinité to a sugar plantation a few miles back in the interior, and

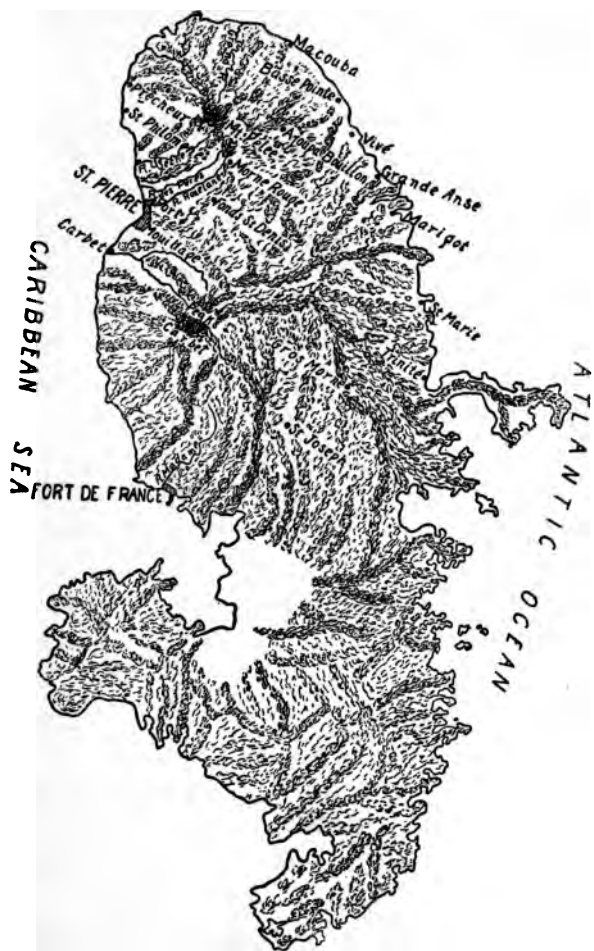
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had an opportunity to see what the "porteeses" of Martinique are like, and what they are able to do and endure in the blazing sunshine of the tropics. Freight of all sorts is carried and distributed throughout the interior of Martinique by women and young girls. Ox-carts are used for the transportation of cane from the fields to the sugar-mills, and little donkeys bring into the villages sacks of charcoal, or loads of green forage that are big enough sometimes to hide them completely from sight; but all kinds of merchandise, including dry goods, groceries, hardware, kerosene, farm products, and even such things as building-stones, bricks, cement, and roofing-tiles, are carried from place to place on the heads of women and girls. I cannot remember to have seen, at any time or in any part of the island, a pack-train of mules, or a wagon or cart of any kind loaded with freight; but you cannot go a mile on any country road without meeting at least one line of straight, vigorous, barefooted women, walking swiftly, with a long, free, swaying stride, and balancing without effort on their heads loads weighing from fifty to eighty

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pounds. If we three travelers could have had ourselves divided and made into six packages, I am perfectly sure that six of those women might have carried us in wooden trays on their heads from Fort de France to Trinité much more rapidly than we were drawn over that distance by a span of able-bodied mules, and that they would have shown less fatigue and distress than the mules did upon arrival. The colored women of Martinique are not attractive, as a rule, in feature; but the habit of carrying heavy loads, for hours at a time, on their heads has given them superb erectness and grace of figure, together with an elasticity of step and a freedom of movement that I have never seen equaled.

As we left the Gros Morne and went down toward the seacoast in the direction of Trinité, there was a complete change in the scenery and vegetation. The mountains gradually became lower; cocoanut palms, bananas, bamboos, and other distinctively tropical trees and shrubs disappeared altogether; vast fields of young cane, which, at a distance, looked like green grass, clothed the slopes of the hills; the few trees that remained stood here and



OUTLINE MAP OF MARTINIQUE

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there in groups or ran in straight lines through the sugar plantations; and the scenery, in general, suggested the north temperate zone.

We reached Trinité about 1 P. M., and drove to the "Hotel des Voyageurs"—a queer place kept by a Frenchified Yankee, forty-five or fifty years of age, named Frost. Mr. Frost wore iron-rimmed spectacles and looked and dressed like a New England deacon; but he could not speak his father's language, and had married a corpulent negro woman, who managed, apparently, both the hotel and its nominal proprietor.

After refreshing ourselves with a good lunch, we obtained fresh mules and started northward, up the eastern coast of the island, toward the plantation of Vivé—a sugar estate at the foot of the volcano, owned by a wealthy French planter named Fernand Clerc. Mr. Clerc had not invited us to make him a visit; but as it was absolutely necessary that we should stay somewhere in the vicinity of the mountain, and, as we could not hear of any "Volcano Hotel" in that neighborhood, we intended to throw ourselves upon Mr. Clerc's hospitality and take the conse-

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quences. I felt some misgivings with regard to the reception that we should get — especially if we should arrive late at night—but Mr. Jaccaci seemed hopeful and confident, and as he would have to do all the talking and explaining, I was satisfied to leave the matter in his hands.

Up to the time of our arrival at Trinité, we had seen little or nothing to suggest the proximity of an active volcano. I had picked up a few small black volcanic stones on the balcony of Bediat's Hotel, and a thin film of bluish-gray ashes covered undisturbed parts of the road between Fort de France and St. Joseph; but the vegetation everywhere looked fresh and green; there was no smoke or dust in the air; the country people seemed to be attending to their work and going about their business as usual; Mont Pelée was hidden most of the time behind the peaks and mornes of Carbet; and there was absolutely nothing to suggest danger or excite apprehension. Beyond Trinité, however, all this was changed. From the crests of the long, sloping mountain buttresses that the road crossed as it followed northward the

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sweeping curves of the surf-beaten coast, we could see the black mantle of storm-clouds in which the volcano was wrapped and the huge column of steam that rose into the clearer air above it. The film of ashes on the road grew thicker and thicker, and the leaves of the trees were covered with a gray deposit which looked like finely powdered Portland cement and that had been sifted over the foliage after a rain and had then dried. Beyond Marigot the volcanic dust lay two inches deep on the road, and the trees — especially the breadfruit trees — had been so plastered with wet, clinging ashes that limbs three or four inches in thickness had been broken by the weight. In certain parts of the road the country looked almost as desolate as if it had been swept by a sleet-storm of Portland cement, which had poisoned the foliage, broken down the branches of the trees, and covered the whole earth with a thin sheet of fine grayish powder.

After leaving Marigot we began to meet long lines of men, women and children flying from the volcano, with their household goods and furniture on their heads. The great

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eruption of May 20 and the threatening appearance of the volcano on the two subsequent days had frightened the whole population in the northern part of the island, and hundreds of fugitives from Vivé, Basse Pointe, Macouba, Morne Rouge, and Ajoupa Bouillon were streaming along the road to Trinité, carrying on their heads everything that it was possible to carry from their abandoned homes. Every member of a family, from the father to the youngest child that could walk, had a load of some sort. The man of the house usually marched in front, leading a cow or a goat, and balancing on his head a cheap yellow trunk. Then came the wife and mother, carrying a baby on one arm, and steadying with the other a big inverted kitchen table, the bottom of which she had filled with pots, pans and dishes. The oldest boy carried a wooden trayful of yams, mangoes, caladium roots, and two-tailed loaves of bread ; his sister followed in his footsteps with a handkerchief bundle of clothing crowned with a big straw hat ; and last of all tottled a five-year-old girl holding a chicken by the wings in one hand and cuddling to



THE CENTRAL PART OF ST. PIERRE



ONE OF THE FEW STREETS IN ST. PIERRE WHOSE OUTLINES
CAN BE TRACED



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her breast with the other a small, fluffy gray kitten.

It was curious and interesting to see what things different families had selected and brought away from their abandoned homes. Some were carrying pillows and mattresses tied up with ropes, while others preferred food to bedding, and were loaded down with bread, mangoes, and edible roots. Some had provided themselves with extra clothing wrapped in big bandanna handkerchiefs, others had left their spare clothing behind and brought away furniture. One woman was carrying three or four chickens in a wide-mouthed earthenware pot; another had on her head a large razor-backed pig, lashed securely with rawhide thongs in a shallow wooden tray. I presume the pig refused to be led or driven away from the volcano, and the woman was forced to carry him. When we saw him, he had given up the struggle as hopeless, and had even stopped squealing; but his fiery little eyes had an expression of wrathful protest, and if he had been able to increase his weight to half a ton, I am quite sure he would have done so. It was really too humiliating,

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even for a pig, to be lashed in a wooden tray and "toted" away from a volcano on a woman's head!

When we passed through Grande Anse, late in the afternoon, the long street running parallel with the sea was crowded with fugitives; an immense throng of turbaned women and children, in scarlet, purple, lilac, magenta, green, black, and dirty white calico gowns, had assembled in front of the "mairie," where food was being distributed by the municipal authorities, and the shrill clamor of excited voices could be heard a quarter of a mile away. The whole crowd stared at us with curiosity and surprise when they saw that we were going on in the direction from which they had just come, and one woman exclaimed, as she pointed at us with outstretched arm, "Look at the poor unfortunates—going toward the mountain!" She evidently thought that no sane man would approach the volcano unless forced to do so by dire necessity; and she regarded us with sympathy and pity as persons compelled by some imperative duty to take desperate chances of life and death.

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Night overtook us between Grande Anse and Vivé, and it grew so dark that we could hardly see the outlines of the road ; but still the long line of fugitives passed us, like a procession of shadowy ghosts, never speaking, never making the least noise, and never stopping except to whisper a prayer in front of some candle-lighted roadside shrine. They were flying in terror from a Vision of Sudden Death, and they fled in perfect silence. In some vague, indefinite way, this shadowy, noiseless procession of fugitives, hurrying from the volcano in the blackness of night, made a certain impression on us all ; but it was impossible, nevertheless, to realize that there was any adequate cause for the panic. "These poor ignorant negroes," I said to myself, "don't know anything about volcanoes, and of course when ashes begin to sift down on them they get frightened and run away, although there's really very little danger." That we, ourselves, might get frightened and run away was a possibility that never once occurred to me ; and if I had happened to experience suddenly then the feeling of nervous dread with which that

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infernal volcano eventually inspired me, I should certainly have thought that I must be ill, and should have proceeded to dose myself with quinine, strychnine, and iron.

Our tired mules were going very slowly and could hardly be lashed into a trot even on the descending slopes, when, about eight o'clock our attention was attracted by a bright light which suddenly appeared on the other side of a gulf of blackness that we took to be an intervening valley. When we reached the spot we found that the light came from a wayside shrine, where, behind a little glass door, two or three candles were burning in front of a small plaster crucifix. A group of fugitives had gathered about it, and when we asked one of them how far it was to the house of Mr. Clerc, he replied, "It is here."

Driving through a long avenue shaded by large mango-trees and bordered by dense hedges, we drew up at last before the spacious mansion of the Vivé sugar estate. Mr. Clerc—a good-looking, frank-faced gentleman about forty years of age—came out with a lighted candle to meet us, gave us a

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most cordial greeting, said that he had heard of our coming, that our rooms were ready, and that dinner was waiting. Twenty minutes later we were all seated around the dining-table, drinking "cyclone" wine (the vintage of the Martinique cyclone year) and discussing that all-absorbing topic of conversation, the volcano.

The eruption of the 20th, Mr. Clerc said, had completed the destruction of St. Pierre, and had thrown thousands of tons of ashes over the Vivé plantation; but since that time nothing had happened. A new crater had opened in the gorge of the river Falaise, about three miles and a half from Vivé, but its activity had been intermittent, and it had done nothing so far but send an occasional flood of boiling water and mud down into the Capot—the river on which Vivé is situated. Morne Rouge was still accessible, but, owing to its close proximity to the main crater, it was regarded as a dangerous place, and most of its inhabitants had fled. Basse Pointe, a village on the north-eastern coast, about two miles and a half from Vivé, had just been partially destroyed

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by a sudden flood of mud, water and stones, but had not yet been wholly abandoned. Many people had fled from Ajoupa Bouillon, a village higher up on the volcano than Vivé and nearer to the Falaise crater; but the priest and the mayor were still there, and gendarmes patrolled the road as far as Morne Rouge.

After a general discussion of the situation, we decided to begin our study of the volcano by making an inspection of Basse Point, where one phase of Pelée's destructive activity was well shown, and where we could get an idea, Mr. Clerc said, of the floods of water, mud and stones that had swept away the Guerin sugar-mill, destroyed Prêcheur, and devastated the whole western slope of the mountain. If the weather should then prove to be favorable, we intended to cross the southeastern flank of Pelée, visit Morne Rouge, and go down as far as possible in the track of the scorching hurricane that rushed across the valley of the Roxelane on the 8th of May and destroyed the city of St. Pierre. In this way we should get views of the volcano from three sides, and see the results

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of its activity in several widely separated places.

It was so dark when we went out-of-doors and looked in the direction of Pelée before going to bed that night that we could see little or nothing. The sky was overcast, and the volcano seemed to be hidden from base to summit in a black mantle of clouds. Not a sound could be heard except a faint rush of water from the river Capot and the regular pounding of the trade-wind surf on the beach.

Soon after daylight Saturday morning we were awakened by the ringing of a bell in the adjacent sugar-mill, and, dressing hastily, we went out to take a look at the Vivé plantation. Before the rain of ashes from Pelée began, the estate of Mr. Clerc, with its mango-trees, blossoming shrubs, scarlet flamboyants, hibiscus hedges, vine-draped walls, climbing roses, gardens and geometrical flower-beds, must have made a striking and beautiful tropical picture. It had the ocean, with a long line of snowy surf, on one side, and the high, forest-clad peaks of Carbet and Pelée on the other ; cool streams from the hills ran through it ; cane-fields gave it a set-

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ting of vivid green ; and between the two-story house, with its broad shady veranda, and the avenue of hibiscus-bushes that led through the grove of mango-trees to the main road, there was a flower-garden of formal beds which must once have been a mass of rich and glowing color. When we first saw the place, however, everything had been ruined. The walls of the house looked as if they had been splashed and spattered with a mixture of mucilage and Portland cement which had trickled down in muddy lines and then dried ; volcanic dust had been shoveled, like snow, off the veranda and lay in heaps beside the walks ; the ground under the mango-trees was covered with branches broken from the trunks by the weight of volcanic sleet ; the flower-beds were buried in grayish mud which had the appearance and consistency of half-dried clay ; the vines were scorched and blackened as if they had been subjected to a zero frost ; nearly half the leaves had fallen from the breadfruit-trees, those that still clung to the twigs were so plastered with the Portland-cement mixture that they looked withered and half dead ; and





ONE OF THE LEAST OBSTRUCTED STREETS IN ST. PIERRE



VALLEY DOWN WHICH THE VOLCANIC DELUGE CAME AT
PRÉCHEUR ON MAY 7

OUR RIDE TO MONT PELÉE

the whole landscape had an appearance of gray ruin and desolation that it is hard to describe, and must be even harder for the reader to imagine. It is probably not an exaggeration to say that upon every square mile of the Vivé plantation there had fallen thousands of tons of pulverized rock in the form of fine, gray, powdery dust—and yet Vivé was five miles from the main crater of the volcano, and in the outer penumbra of the deadly shadow cast by its ash-laden clouds.

III

BASSE POINTE AND MORNE ROUGE

ON the morning after our arrival at Vivé we had, for the first time, a clear view of the volcano from the eastern side, and were able, with the aid of a field-glass and a fairly good French map, to get something like a correct idea of its topography and contour.

Mont Pelée, with its radiating buttresses, occupies the whole northwestern end of Martinique, from the river Capot to the ocean. If a curved line were drawn across the island from St. Pierre to Vivé, in such a manner as to include the valley of the Capot, it would form, with the ocean boundary, a nearly perfect circle, about ten miles in diameter, with the main crater of the volcano

BASSE POINTE—MORNE ROUGE

near its centre, and a series of alternating ridges and valleys radiating on all sides to the periphery. If this circle were regarded as a huge wagon wheel, the main crater would occupy nearly the position of the hub ; the divergent arêtes or buttresses would represent the spokes ; and most of the neighboring settlements would stand at short intervals around the rim.

If all the ridges or buttresses were straight, and if they had a regular and uniform slope from the main crater to the periphery of the base, the volcano would have the shape of a low cone, with a gradient of about one in six. Inasmuch, however, as some of these arêtes are very irregular in contour, keeping nearly if not quite up to the level of the crater for half a mile or more, and then falling in lines that are convex rather than concave, the mountain looks more like a "hog-back" than a cone. From Vivé it has the appearance of a great mountainous ridge, whose contour-lines are not generally steep, and whose crest, seen in profile, is a slightly incline plane. From its highest point, which seems to be north of the main crater, it slopes

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gently southward for three-quarters of a mile, and then falls rather abruptly to the long, wavy line of the watershed that separates the upper Capot from the Rivière des Pères and the Roxelane.

High up on the volcano, at the heads of the diverging arêtes, rise a dozen or more streams which tumble down to the sea on all sides of the mountain, falling very rapidly at first in deeply eroded gorges, shaggy with tropical vegetation, and then flowing more slowly through open valleys whose slopes are covered with a green carpet of young sugar-cane.

About a mile and a half east of the main crater, in the gorge of the wild mountain torrent known as the Falaise, there is an intermittent sub-crater, which throws out at intervals clouds of steam more or less densely charged with dust, and in the gorge of the Rivière Blanche, on the southwestern slope of the mountain, there is a second vent, which seems to be connected with the main crater by a long fissure, and which is a more dangerous opening, perhaps, than either of the others.

BASSE POINTE—MORNE ROUGE

If I had happened to see Mont Pelée from the northeastern coast of Martinique before it began to be active, I do not think that its form would ever have suggested to me the idea of a volcano. It is not a cone, nor even a peak; it is not streaked with ancient lava-beds; it has no notch or depression that looks like a crater; and before the eruption of May 8 its lower slopes were green with sugar-cane, tobacco, cocoa, and indigo; its gorges were full of vines, wild bananas, arborescent ferns, flowering shrubs, and bread-fruit-trees, and the whole massive ridge was clothed with luxuriant vegetation to its very summit. It looked, doubtless, at that time, like anyone of a hundred mountains that might have been seen in non-volcanic parts of the tropical zone. No mistake as to its character, however, could have been made when I saw it first from Vivé. Above the line of Mr. Clerc's sugar plantation it was bare and gray as a waterless, sun-scorched ridge in a Central Asiatic desert. The trees in the gorges had all been killed by volcanic dust, and did not show a trace of color; the surfaces of the arêtes were covered two feet

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deep with compacted ashes, through which wrinkle-like furrows had been cut by down-rushing water ; the upper slopes, near the central part of the crest, were strewn with stones, boulders, and volcanic bombs ; the northern end of the ridge was almost as white as if soda or salt had been sifted over it ; and above the main crater stood a great pillar of cloud a thousand feet in height, which bent a little to leeward with the steady trade-wind, and dropped a dark, rain-like shower of ashes over the village of Prêcheur. The whole mountain looked bare, desolate, and threatening.

We spent most of our first day at Vivé indoors. The sky after breakfast became overcast ; heavy storm-clouds gathered about the summit of the volcano ; and the weather looked so unpromising that we decided not to attempt anything more difficult than a short drive to the village of Basse Pointe, which had just been deluged, and partly destroyed, by a flood of water and mud which rushed down upon it suddenly from the volcano. Mr. Clerc volunteered to accompany us in the capacity of driver and guide ; mules and

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a light two-seated carriage were ordered, and in half an hour we were sweeping around the curves of the hard, beautifully kept road which skirts the surf-beaten coast from Trinité to Grande Rivière.

Groups and files of fugitives from the northern villages began to pass us as soon as we came out upon the highway. Barefooted, bareheaded negroes in dirty cotton shirts and drawers were driving southward unyoked oxen with coils of heavy iron chain around their horns; women who had pinned bright-colored paper pictures of the Virgin Mary over their hearts to protect them from the volcano, but who seemed to have more faith in their own legs than in the Madonna, passed us from time to time with headloads of furniture, kitchen utensils, bedding, or food; children trotted soberly behind their parents with wooden trays of fruit on their heads, or pet chickens, kittens, or puppies in their arms; and now and then a mounted planter in helmet and white duck rode past on his way to Trinité or Fort de France. All were endeavoring, apparently, to get out of range of a volcano that had shown its

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ability and readiness to kill at a distance of five miles with stones, mud, fire, lightning, steam, ashes, and floods.

When we reached Basse Pointe and saw the destruction that had been wrought by the flood of water and the semi-liquid avalanche of mud and boulders that had rushed down the stream on which the village is situated, we felt more inclined than ever to sympathize with the fugitives and to excuse even the weak faith of the women with the paper pictures of the Madonna pinned over their hearts. Nobody could be expected to live in the shadow of a mountain that might at any moment let loose, somewhere up in the clouds, a Johnstown flood of mud and water loaded with ten-ton masses of volcanic rock. Where the torrent came from that swept through Basse Pointe I do not know; but it carried away trees and houses, strewed the bed of the stream with enormous boulders torn out of the side of the volcano, and left in the lower stories of the houses that it did not carry away a deposit of soft grayish mud four or five feet deep.

After Mont Pelée began to show signs of

BASSE POINTE—MORNE ROUGE

activity, in April, overwhelming floods of water or liquid mud, carrying volcanic boulders of immense size, began to rush at intervals down its steep gorges, on all sides and in four or five widely separated places. The first one, which destroyed the Guérin sugar-mill and killed thirty persons on the 5th of May, was due, unquestionably, to the giving way of the lower bank of the high mountain lake known as the Etang Sec, which occupied the basin of an ancient crater near the source of the Rivière Blanche. The floods that swept through Basse Pointe and Prêcheur, however, cannot be attributed to such a cause, for the reason that no lakes were known to exist on the heights above those settlements. Some of the American geologists who visited Martinique are of the opinion that the craters of Mont Pelée—particularly the sub-craters in the valleys of the Falaise and the Rivière Blanche—throw out, at intervals, these immense quantities of hot water and mud; but this explanation is open, I think, to serious objection. It is not easy to understand how water in liquid form and mud in the shape of mud can exist in the chimney of

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a volcano as hot as Mont Pelée. If the water got into the mountain at or below the sea-level, it would have to be lifted to heights of from 2,000 to 4,000 feet before it could flow out of the craters, and, meanwhile, it would probably be converted into steam by the intense heat of the containing walls and of the molten or incandescent rock at the base of the chimney. There might happen to be subterranean reservoirs of water in the interior of the volcano, or in the earth under it, and they might be disrupted by volcanic action ; but it is not probable that the number of such reservoirs would equal the number of floods that have occurred on the slopes of Mont Pelée since the volcano became active. It seems to me more reasonable, therefore, on the whole, to suppose that the floods originate outside the craters and are due to cloud-bursts and extraordinary rainfalls.

Tropical storms that have no connection whatever with volcanoes, and that, from a meteorological point of view, are perfectly normal, often cause tremendous floods in narrow valleys that happen to lie between extensive watersheds, and if to the natural down-

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pour of such a storm were added the precipitation due to rapid condensation of immense volumes of steam from the crater of the volcano, the result might be a sudden deluge that would sweep thousands of tons of ashes off the slopes of the watershed, tear hundreds of old volcanic boulders out of the loosely compacted, cindery sides of the mountain, and then rush down the nearest drainage-channel like a huge tidal wave of liquid mud and stones, carrying everything before it.

The objections made by the natives to this explanation of the disasters at Prêcheur and Basse Pointe are, first, that the floods were not preceded nor accompanied by great storms: second, that storms severe enough to produce such effects were unknown before the volcano became active; and, third, that a storm due to general meteorological conditions would affect the whole mountain and not merely a single gorge or valley on one side of it.

It is quite possible, however, that there may be cloud-bursts, or heavy rain, on the summit without any general storm. The

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top of the mountain is often hidden by vapor when the sky elsewhere is clear ; and the rapid condensation of the steam discharged by the volcano might cause heavy local rains under the cloud-cap without any noticeable precipitation below.

Until Mont Pelée shall cool and quiet down so that a careful examination may be made of its craters and valleys, it will be impossible to determine with certainty the origin and cause of these catastrophic floods of muddy water. All that can be said at present is that although the water and mud may come out of the volcano, they are probably ejected in the form of steam and dust, which turn to water and mud as the result of subsequent condensation and mixture.

Before we had been half an hour at Basse Pointe it began to rain ; and as Mr. Varian had completed a sketch of the flood-swept valley, and Mr. Jaccaci had obtained from the remaining inhabitants of the village all the information that they could furnish with regard to the disaster, we returned to Vivé.

Rain continued to fall at intervals throughout the day, and turned the layer of ashes on

BASSE POINTE—MORNE ROUGE

the ground into a soft, gray, muddy slush, through which it was very unpleasant to have to walk. We therefore stayed at home, and spent most of the afternoon in the shelter of the broad, sea-facing piazza, where we smoked, talked, and refreshed ourselves at proper intervals with cooling drinks. The subject of the conversation, of course, was the volcano, and Mr. Clerc gave us a graphic description of the destruction of St. Pierre, which he witnessed from a long ridge, or *morne*, about a mile east of the city. At the time when Pelée became active he happened to be in St. Pierre, with his wife and children, visiting friends. Alarmed by the frequent showers of ashes and the threatening appearance of the volcano, as well as by the destruction of the Guerin sugar-mill on the 5th of May, he took his family to the house of another friend on the heights of Mont Parnasse, where at least no danger was to be apprehended from such floods as the one that had just swept down the valley of the Rivière Blanche.

The morning of May 8 dawned clear ; but a column of vapor was rising to a great height above the main crater of Pelée, and ashes

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were falling all along the line of the coast from St. Pierre to Prêcheur. An occasional detonation could be heard in the direction of the mountain, but there was no other sign or forewarning of the impending catastrophe. About eight o'clock, with a rending, roaring sound, a great cloud of black smoke appeared suddenly on the southwestern face of the volcano near its summit, and rushed swiftly down in the direction of St. Pierre as if it were smoke from the discharge of a colossal piece of artillery. There was no sharp, thunderous explosion when the cloud appeared, nor was it preceded or followed by an outburst of flame; but as it rolled like a great torrent of black fog down the mountain slope there was a continuous roar of half-blended staccato beats of varying intensity, something like the throbbing, pulsating roar of a Gatling-gun battery going into action. The time occupied by the descent of this volcanic tornado-cloud was not more, Mr. Clerc thinks, than two or three minutes; and if so, it moved with a velocity of between ninety and a hundred and thirty-five miles an hour. It struck the western end of Mont Parnasse

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about half a mile from the place where Mr. Clerc was standing; swept directly over St. Pierre, wrecking and setting fire to the buildings as it passed, and then went diagonally out to sea, scorching the cocoanut palms and touching with an invisible torch a few inflammable houses at the extreme northern end of the village of Carbet.

It began almost immediately to grow dark—probably as a result of the mushrooming out of the immense, ash-laden column of vapor thrown heavenward from the main crater—and in ten or fifteen minutes the only light to be seen was a faint glow that came through the falling ashes from the burning ruins of St. Pierre. It was so dark that Mr. Clerc could make sure of the presence and safety of his wife and children only by groping for them and touching them with his hands. He could not see even the outlines of their figures. In twenty minutes or half an hour, a little light began to filter through the inky canopy of volcanic dust overhead, and it became possible to move about; but the landscape was still obscured by falling ashes mixed with rain, and Mount Pelée had wrapped it-

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self from base to summit in a black mantle of vapor. Appalled by the frightful volcanic hurricane, the Egyptian darkness, the glow of the burning city, and the mystery of the whole terrible catastrophe, Mr. Clerc fled with his family and friends to a place of greater safety in the interior of the country. At the earliest opportunity he sent his wife and children to one of the neighboring islands—I think Guadeloupe—visited the ruins of St. Pierre, where many of his relatives and nearly all his dearest friends lay buried under thousands of tons of stones from shattered walls, and finally returned alone to his ash-powdered plantation at Vivé.

That Mr. Clerc was naturally a man of great courage appears not only from the fact that, after such an experience, he returned to his estate, which was well within the zone of danger, but from the further fact that, with his overseer, Mr. Chancel, he climbed Mont Pelée to the dry bed of the old crater-lake, and ascertained the location of the new summit-fissure through which the volcano was then discharging. He regarded his own residence, however, as a dangerous place to

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stay at night, on account of the lowness of its situation, the proximity of the Falaise crater, and the possibility that a volcanic deluge from that part of the mountain might sweep down the valley of the Capot and overwhelm his house, just as the torrent of boiling water and mud overwhelmed the sugar-mill of Guerin in the valley of the Rivière Blanche. He, therefore, went every night to sleep in the house of a friend about two miles away, at the end of a high spur thrown out to the northward from the Carbet peaks. He had once saved himself, his wife, and his children by taking to the hills; and his escape on that occasion was too recent to have been forgotten. His housekeeper, Mademoiselle Marie—a gentlewoman of dauntless intrepidity—his overseer, Mr. Chancel, and all the servants of the household, remained with us at Vivé.

When Mr. Clerc bade us good-night on Saturday, it was understood that if the weather should prove favorable we would all drive the next day over the southeastern flank of Mont Pelée to Morne Rouge, and then go as far as possible down the track of

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the volcanic hurricane which swept across the road near the Grande Reduit on its way to St. Pierre.

Sunday morning dawned clear ; the volcano seemed to be quiescent, and at seven o'clock we started in two carriages for Morne Rouge. The road ran for a short distance along the right bank of the Capot, crossed the gray, muddy stream on a stone bridge, and then wound upward over gentle slopes, covered with uncut sugar-cane, toward the village of Ajoupa Bouillon. The scenery did not begin to be really mountainous in character until we reached the Rivière Falaise, which comes down to the Capot through a deep, wild gorge bounded by the high arêtes known as the Calebasse and the Morne Balais. From the bridge over this stream we ascended steadily through the half-deserted village of Ajoupa Bouillon to a height of eight hundred or one thousand feet, and then began to go around the mountain, across an interminable series of gorges and arêtes which run steeply down the Calebasse watershed to the Capot. The scenery in this part of the route was splendidly wild and pictur-

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esque, the road running back and forth in long, narrow, horseshoe curves around the heads of profoundly deep ravines, which were filled with palms, arborescent ferns, wild bananas, delicate plumes of bamboo, breadfruit-trees hung with lianas and festooned with vines, and a tropical undergrowth of almost indescribable luxuriance. Everything, however, seemed to have been scorched and withered by the hot breath of the volcano. The vines were almost bare ; the blackened fronds of the tree-ferns hung limp and lifeless from their slender trunks ; the road was strewn with the big, withered leaves of the breadfruit-trees ; the broad, ragged foliage of the bananas had turned brown ; and the luxuriant undergrowth had been plastered, broken, and beaten down by a heavy sleet-storm of volcanic ashes. Almost all of the foliage from which the ashes had been washed by rain looked brown or black, as if it had been scorched by fire or nipped by a zero frost.

Half or three-quarters of a mile from Morne Rouge we emerged from the dense tropical forest that covers the middle slopes

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of the volcano on the southeastern side, and ten minutes later drove up past a life-sized crucifix on the high, breezy divide that separates the Atlantic watershed from that of the Caribbean. From this point of view we could see the flat blue plain of the ocean from St. Pierre almost to Prêcheur, with the smoking crater and ash-whitened arêtes of Mont Pelée at our right, the steep forest-clad peaks of Carbet on our left, and the spire of the Morne Rouge church in the near foreground, directly ahead.

Driving through a long street of ash-plastered and abandoned houses, we turned in to the residence of the curé, which stood beside the large church, near the centre of the village. Father Mary, a middle-aged man with gray eyes and a fresh complexion, came out in cassock and incongruous white cork helmet to meet us ; gave us a cordial welcome and led us into the refectory of the parish house, where we all sat down at a big table half covered with a white cloth, to take refreshments, discuss the volcano, and exchange items of Martinique news.

The curé did not look at all like a man



FATHER MARY

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who had been subjected to long continued nervous strain, or who had been rendered apprehensive by weeks of imminent danger. On the contrary he seemed as buoyant and light-hearted as a frolicsome boy; laughing and joking with Mr. Clerc and Mr. Chancel; and exclaiming in feigned astonishment when Mr. Varian and I declined the stiff drinks of rum that he poured out for us, "What! No rum? Is this, then, a temperance society?" But a glance at his face when it was serious and in repose showed that he was a man of character and courage. Some ministers of God, living in imminent danger near the crater of an active volcano, might have become morbid and gloomy in the presence of what seemed to be manifestations of Divine wrath; but Father Mary's nature was too brave, sane and cheerful to be warped by fear or gloomy superstition. He might not be able to reconcile the destruction of St. Pierre with the providence of a loving and merciful Father; but he trusted where he could not understand; discharged faithfully all his duties as a priest, a Christian and a man; and lived, as he had always lived, a brave,

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cheerful, natural life, even in the threatening shadow of death. Vicar-General Parel was mistaken when he wrote to the bishop of the diocese "Père Mary has at length left Morne Rouge, being the last to abandon the place." * Père Mary never left his post of duty.

After refreshing ourselves with a light breakfast, we all went out at Father Mary's suggestion, to take a look at the village, and at the mountain from that point of view.

The southwestern slope of Mont Pelée as seen from Morne Rouge, consists of a series of high wooded ridges or arêtes, with deep intervening valleys, running down to the sea from the Calebasse divide. Before the volcano became active, the bottoms of these valleys were covered with truck farms, garden-plots or plantations of cane; and there were little nooks or patchwork squares of cultivation, here and there, even on the wooded slopes of the arêtes; but the whole country, when we saw it, looked bare, desolate, and gray. The forests were apparently

* *Century Magazine*, August, 1902, p. 617.

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dead, the luxuriant undergrowth was leafless, and a deep layer of rain-compacted ashes gave a sterile, desert-like aspect to a landscape that was once as green and fair as any in Martinique.

Before Mont Pelée became active, Morne Rouge was one of the most beautiful villages on the island. Situated at a height of 1400 feet, on the crest of the divide between the Atlantic and the Caribbean, it overlooked the ocean on both sides, and commanded a magnificent view, not only of the volcano, but of the Carbet peaks, the rich, fertile valley of Champ Flore, and the green, forest-clad mornes beyond the Capot and on the headwaters of the Roxelane. It was, as the curé said, "a real Garden of Eden," set in a natural cyclorama of blue water, verdant hills, and cloud-capped volcanic peaks. It had long been a favorite place of resort for the citizens of St. Pierre, many of whom had country villas there, and the commune of which it was the centre had a population of nearly 5000 souls. At the time of our visit, its beautiful gardens had been ruined by ashes; volcanic dust lay deep in its streets; nine-

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tenths of its houses were closed and empty ; and it had less than 200 inhabitants. Nearly all who could get away fled after the catastrophe of May 8th ; but Father Mary had a little asylum or house of refuge there for the old, poor, and infirm of his parish, and as it was impossible for these helpless people to escape, he, with a few of the bolder spirits of the villiage, stood by them, watching, with steady and unfaltering courage, eruptions that devastated the neighboring slopes of the mountain ; swept the village with storms of ashes ; shook its houses with the thunder of subterranean explosions ; set the skies ablaze with volcanic lightning, and threatened Morne Rouge with the fate of St. Pierre. Several times between the 8th of May and the 1st of June, the terror-stricken population of northern Martinique fled from the volcano en masse ; but Father Mary, far inside the danger line, stood by his helpless and frightened people, expecting to die but incapable of shirking his duty or deserting his post. When I remember how exposed Morne Rouge was ; how near it stood to the main crater, and how terrifying some of the

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eruptions must have appeared from that point of view, the devoted priest in his worn, shabby cassock, standing by his aged and feeble parishioners and encouraging the handful of villagers who remained to help him, seems to me a really impressive and heroic figure.

IV
IN THE TRACK OF THE
VOLCANIC HURRICANE

NEXT to Father Mary, the most interesting person in Morne Rouge, at the time of our visit, was Auguste Ciparis, a negro criminal who lived through the destruction of St. Pierre in a dungeon of the city jail. We had heard of this man in Fort de France, and had been told that he was the sole survivor of the great catastrophe ; but we had not been able to find anyone who had actually seen him, or who knew where he was, and we had finally come to regard him as the product of some newspaper man's imagination. Father Mary, however, assured us that he was a real person, and that he had been brought to Morne Rouge four days after the disaster by two negroes who

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had accidentally found him in the ruins of the city. Of course we wanted to get a statement of his unique experience, and after we had looked around the village a little, we all went to see him. We found him in one of the bare, fly-infested rooms of an abandoned wooden dwelling-house on the main street, which the curé had turned into a sort of lazaret. As there was no physician, surgeon, or pharmacy in the place, the unfortunate prisoner had had no treatment, and the air of the small, hot room was so heavy and foul with the offensive odor of his neglected burns that I could hardly force myself to breathe it. He was sitting stark naked, on the dirty striped mattress of a small wooden cot, with a bloody sheet thrown over his head like an Arab burnoose and gathered in about the loins. He had been more frightfully burned, I think, than any man I had ever seen. His face, strangely enough, had escaped injury, and his hair had not even been scorched; but there were terrible burns on his back and legs, and his badly swollen feet and hands were covered with yellow, offensive matter which had no resemblance

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whatever to human skin or flesh. The burns were apparently very deep—so deep that blood oozed from them—and to my unprofessional eye they looked as if they might have been made by hot steam.

When asked to describe all that happened at the time when he received these burns, Ciparis said that the cell he occupied in the St. Pierre prison was an underground dungeon, which had no other window than a grated aperture in the upper part of the door. On the morning of May 8, while he was waiting for breakfast, it suddenly grew very dark ; and almost immediately afterward hot air, mixed with fine ashes, came in through the door-grating and burned him. He rushed and jumped in agony about the cell and cried for help ; but there was no answer. He heard no noise, saw no fire, and smelled nothing except “ what he thought was his own body, burning.” The intense heat lasted only a moment, and during that time he breathed as little as possible. There was no smoke in the cell and the hot air came in through the door-grating without any noticeable rush or blast. He had on, at the time, hat, shirt,

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and trousers, but no shoes. His clothing did not take fire, and yet his back was very severely burned under his shirt. The water in his cell did not get hot—or, at least, it was not hot when he first took a drink, after the catastrophe.

We questioned him closely with regard to sounds and smells ; but he continued to insist that he heard no explosion or loud noise of any kind, and that there was no perceptible odor of gas or sulphur in his cell. Hot air, mixed with dust, came in at the grated window in the upper part of the door and burned him ; and that, he said, was all there was of it. For a long time he groaned with pain, and cried at intervals, “ Help ! Save me ! ” but no one answered, and he did not hear a sound again until the following Sunday, nearly four days after the catastrophe. Then he faintly heard human voices above his head, and renewed his cries for help. Somebody shouted, “ Who’s that ? Where are you ? ”

“ I’m down here in the dungeon of the jail,” he replied. “ Help ! Save me ! Get me out ! ”

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The voices were those of two negroes who were exploring the ruins of the city and who happened to pass the shattered walls that marked the site of the jail. As soon as they became satisfied that there was a living human being in the mass of wreckage and débris they cleared away the stones, found the door of the dungeon, forced it open, and let the half-dead prisoner out. He had been four days without food, and was consequently weak and faint; but after taking a drink of water he felt better, and was able, with some help and support from his rescuers, to walk six kilometers up the valley of the Roxelane and over the Grande Redit to Morne Rouge.

Some doubt has been expressed as to the existence of any survivor of the St. Pierre disaster—or, at least, of any person who was actually in the city at the time of its destruction. Several American correspondents in Fort de France wrote their papers that the wild tale of the rescued prisoner was wholly imaginary; and one well-informed journal in New York said editorially: “Although the story of the only survivor of St. Pierre, the

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prisoner in the underground cell of the jail, has been proved to be a fake, it was published so broadcast, and was so picturesque, that it would not be strange if it were incorporated in the permanent records of the disaster." The story of the rescued prisoner, however, is not a fake, and I think that it ought to be "incorporated in the permanent records of the disaster," not on account of its picturesqueness, but because it helps to throw light on the real nature of the catastrophe.

Father Mary, a man of unimpeachable honor and integrity, brought to us for interrogation one of the two negroes who took Ciparis out of the dungeon, and vouched for him as a trustworthy witness whom he personally knew, and Mr. Clerc positively identified the prisoner as a man whom he had long known by name, and whom he had often seen in the streets and on the water-front of St. Pierre before the disaster. He also knew personally the negro who brought Ciparis to Morne Rouge, and told us that he was "a good man and all right." I think there can be no doubt, therefore, of the essential truthfulness of the prisoner's story, and I have re-

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corded here, just as it stands in my notebook, without trying to edit it, or work it up into a "picturesque" narrative.

Ciparis, who was a strong young negro about twenty-five years of age, impressed me as an uneducated man, of average intelligence, whose natural temperament was stolid rather than excitable. He answered all our questions simply and quietly, without making any attempt to exaggerate or to heighten the effect of his narrative by embroidering it with fanciful and marvelous details. He heard no explosions or detonations; saw no flames; smelled no sulphurous gas; and had no feeling of suffocation. He was simply burned by hot air and hot ashes which came into his cell through the door grating. What happened outside he did not pretend to know; but his testimony with regard to what happened inside could not be shaken by any amount of cross-examination, and I shall have occasion to refer to it when I come to a consideration of the nature and causes of the St. Pierre catastrophe. Thanks to Mr. Jaccaci, who sent to the Military Hospital in Fort de France for linseed oil, limewater,

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phenic acid, and aseptic bandages, the prisoner's burns, when we visited Morne Rouge the second time were properly cared for and dressed, and there seemed to be every probability that he would live.

In order to get as clear an idea as possible of the nature of the volcanic discharge that destroyed St. Pierre, we intended to spend a part of the day in making an examination of the Roxelane valley, over which the hurricane swept before it struck the city. We therefore climbed into our carriages again, after visiting Ciparis, and drove out of the village on the St. Pierre road.

Half-way up the volcano, on the edge of the arête that separates the Rivière Sèche from the Rivière des Pères, we could distinctly see, silhouetted against the sky, the long, ragged line of branchless trees and splintered stubs which marked the southeastern boundary of the hurricane track ; and, although the lower part of this track was hidden from view by the nearer mass of a high intervening hill, we knew that it must cross our road about midway between Morne Rouge and St. Pierre.

A fifteen-minute drive down the crest of a

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sloping buttress brought us to the bold promontory of the Grande Redit, where the buttress ends suddenly in a high, steep bluff, and the road, turning suddenly upon itself, descends four or five hundred feet, in the double curve of a reversed letter S, to the valley of the Roxelane. A little chapel and three or four deserted houses stood near the road at the left, and on the highest part of the bluff, facing Mont Pelée, was a life-sized, tinted figure of Christ crucified, which was completely covered, from head to foot, with a sun-dried plaster of volcanic ashes. It looked as if a fire engine had been throwing on it a stream of sticky mucilage thickened with Portland cement.

Getting out of our carriages, we walked passed the crucifix and through a thicket of leafless bushes to the extreme western end of the bluff, from which an unobstructed view could be had of the tornado track where it crossed the once beautiful valley of the Roxelane. A more impressive picture of ruin and desolation it would be impossible to imagine. The valley looked as if it had first been swept by a frightful hurricane that had strewn it

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with trees, branches and the fragments of wrecked houses, and had then been overwhelmed by a Johnstown flood, which, after sweeping the immense masses of wreckage into heaps, had finally subsided, leaving everything covered with a thick layer of gray mud. Scattered here and there over the surface of this mud were bodies of dead men, carcasses of mules, wheels of dismembered carts, big iron kettles, pieces of machinery from some wrecked sugar mill, timbers, boulders, roofs of houses, and great windrows of leafless, uprooted trees, which had been swept down into the valley from the slopes above.

The western end of the Grande Reduit was just on the edge, apparently, of the hurricane's path. Some of the huts near the chapel had been injured, but the chapel itself was intact; the big crucifix was still standing, and within a radius of forty or fifty yards there were a number of trees that had not been touched. Behind one of the houses, however, we found the carcass of a mule, and a short distance down the road leading to the valley we came upon an overturned, wrecked carriage, half buried in a pile of broken-off

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tree branches. From the fact that there were no bodies of horses or mules in the immediate vicinity of this carriage, we concluded that it had not been in use at the time of the catastrophe, and had probably been blown there from some farm-house or sugar estate on the other side of the valley. I examined it closely for traces of fire, but could find none. The light leathern top was torn, but it had not been burned, nor even scorched. Our conclusion that this carriage must have been empty when the tornado struck it proved to be erroneous. A little more than a week later we found in the municipal hospital at Trinité, two French gentlemen named Lassère and Simonut, who were driving up from St. Pierre in this very carriage when the black cloud from the volcano swept across the Roxelane valley. They saw it coming, just as they began the ascent of the Grande Reduit, and lashed their mules into a gallop with the hope of escaping it; but the eastern edge of it caught them about sixty feet from the crucifix on the top of the hill. It approached with a roaring, "galloping" sound, struck them like a mighty rush-



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ing wind; overturned and completely wrecked their carriage, setting the mules free; and then swept across the summit of the Grande Reduit, leaving them stunned, burned and half dead in the shattered vehicle. They saw no flame or fire; did not notice anything like suffocating gas; and smelled nothing except what they described as the "odor of smoke from lava." Both felt the intense heat of the blast as it swept over them, but Mr. Lassère did not realize that he was seriously burned until he crawled out of the wrecked carriage. Darkness came quickly afterward, but they succeeded in getting into a small deserted house near the little chapel or shrine, and there they waited until it became light enough so that they could walk to Morne Rouge. Their clothing showed no signs of injury from heat, but their backs were badly burned or scalded under it; the skin at once peeled off their hands so that it hung from them in strips; and when they arrived at Morne Rouge, their shoes had to be cut from their burned and swollen feet. What became of their mules, they did not know; but we found the carcass of one of them about

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fifty yards from the carriage, behind one of the palm-shacks on the crest of the hill.

The effects of the volcanic discharge, in this case seem to have been such as would have been produced by a hot steam-blast of high velocity but brief duration. If Messrs. Simonut and Lassère had been struck by the edge of a steam discharge from an exploding boiler, their bodies would probably have been scalded under their clothing in precisely the same way, and without injury to the clothing itself; while if they had been burned by flame or incandescent matter, their clothing and the light top of the carriage would certainly have shown some traces of fire. As they were on the extreme outer edge of the blast, the steam was doubtless mixed to some extent with air; and the heat although great enough to scald flesh, was not intense enough to ignite clothing or scorch wood.

We drove down into the valley of the Roxelane without finding any impassable obstruction; but a quarter of a mile beyond the base of the Grande Reduit we were stopped by a barrier of immense uprooted trees, which had been blown or washed upon the

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road, and which made further progress in a wheeled vehicle impossible. Leaving our carriages there, we walked down the hurricane track towards St. Pierre, through a chaos of demolished houses, uprooted trees, volcanic boulders, broken tiles, smashed crockery, twisted iron bedsteads, sheets of metallic roofing, fire-scorched remains of pianos, cart-wheels, brass chandeliers, farm implements, bronze statuettes, and ash-covered wreckage of every imaginable description. Houses, solidly built of stone and cement, had been torn to pieces and scattered as children's play-houses of kindergarten blocks would be torn to pieces by the discharge of a thirteen-inch gun. Absolutely nothing of human construction or erection seemed to have been strong enough or solid enough to withstand the impact of that tremendous blast.

Half or three-quarters of a mile from the Grande Redit, Mr. Clerc stopped in front of a low shapeless mound of ash-plastered building-stones, and, in a voice trembling with emotion, said: "This was the country house of Senator Knight's father; I knew him well." No one would have imagined

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that there had ever been a house there. It looked like a mass of stones heaped together at random and half buried by a sleet-storm of ashes.

In this part of the Roxelane valley there had been a large number of country houses and villas belonging to wealthy residents of St. Pierre. Some of them stood on natural or artificial mounds between the road and the river, and others on high terraces cut in the hillside above the road and supported by massive retaining walls of heavy masonry. Most of these houses, apparently, had been made of stone rubble; and when the aerial battering-ram of the tornado struck them, they burst asunder, went to pieces, and fell in avalanches of loose stones upon the road below, covering it and blocking it up so that in many places there was no trace of a road left, and we had to pick our way across the heaps of débris as best we could.

In the area swept by this volcanic hurricane, as in the tracks of many of our western tornadoes, there were fragile objects of one sort or another, that had miraculously escaped destruction. Against a fragment of a

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wall, in one place, for example, I found hanging uninjured and undisturbed, a thin plaster bas-relief of Christ before Pilate. The building had been so completely demolished that I could not tell, from a mere inspection of the ruins, whether it had been a private residence or a church ; but the frail bas-relief, which might have been broken to pieces by a blow with a lead-pencil, had sustained no injury whatever. In another place, in what had apparently been the back-yard of a country house, I saw a wooden cage of three compartments faced with wire net-work, which contained the remains of two pet animals—a mongoose and a small bantam chicken. Both had been killed, doubtless, by the heat of the blast ; but the feathers of the chicken had not been scorched, and the cage, although covered with ashes, had not been broken or burned.

The ruin and desolation in this valley would have been impressive and terrible enough, even if not related in any way to human activities and human existence ; but most of these wrecked houses had been the homes of the living, and were now cairns of

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stones heaped up over the remains of the dead. The hot, breezeless air was heavy and fetid with the stench of decaying bodies, and every now and then we came upon a swollen, blackened corpse lying out in the open or half buried in an ash-cemented pile of stones. In two or three places, on the road, or beside it, I saw human bodies that had been rolled, tumbled, and smashed by the tornado until they were nothing but huddled-up masses of torn, bloody clothing and lacerated flesh, out of which were sticking the splintered remains of arm and thigh bones. Poor Mr. Clerc, who had been entertained in many of the houses whose ruins we passed, and who knew personally nearly all of the people in this valley, became so overwrought at last with grief, nervous excitement, and the horror of the environment that he broke down in a fit of sobbing and walked away from the party until he could recover his self-control.

Half-way down from the Grande Reduit to St. Pierre a small stream came into the tornado valley from the south, and just at the junction of this stream with the Roxelane

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there stood, before the eruption of May 8, a pretty suburban village known as the Village of the Three Bridges. At the time of our visit it had been completely wrecked and destroyed, with the exception of four or five houses which stood in the mouth of the lateral ravine under the shelter of a high bluff. The front door of the first one we came to was open, and a rocking-chair was standing out on the piazza. Just inside the door, on a narrow cot-bed, lay, in a perfectly natural position, the figure of a dead man. He was plastered from head to foot with ashes, but, in places where rain had blown in through the door or window and washed the ashes off, I could see the skin of his neck, face and hands. Flies were crawling all over him, and from a wound in his head blood had run down on the mattress and dripped from there to the floor, where it had made a little pool. There were no footprints in the ashes, and the house had not been entered by any one since the catastrophe of May 8. The man had evidently been killed instantly; but whether by heat, by noxious gas, or by a volcanic stone, it was impossible

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to determine. All that we could be certain of was that he was lying on that cot when the hurricane swept across the valley and that he never moved afterward.

In the next room there were a man, a woman, and a child; the man lying on the floor, face downward, with his arms stretched out, and the woman and child at a little distance, huddled together with their arms under them. All were in such a state of decomposition that they would have been wholly unrecognizable. The adjoining house was also full of dead, but they were so encrusted with ashes that it was impossible to determine age, sex, or color. Just across the stream, close to the bluff, was a pretty two-story country house with a good-sized front yard which had been filled with geometrical flower-beds and blossoming shrubs. We explored it from top to bottom, but found nothing alive in it except a huge black tarantula, four or five inches across, which ran out of a crevice over one of the second-story doors. The venomous insect had survived where all the higher forms of life had perished.

THE TRACK OF THE HURRICANE

I have never experienced anything more trying to the nerves than this prowling through silent, empty houses, expecting every moment to come, in the semi-darkness, upon the ghastly, ash-plastered bodies of dead men and women. If they had looked like other corpses, they would not have made such an impression upon my imagination; but in these gray, dust-covered figures there were suggestions of some mysterious, frightful end, worse than death by sickness, by accident, or even by murder. In the lower story of one house, where we had not yet found any dead, Mr. Clerc stopped suddenly, listened with strained attention for an instant, and then cried in a hoarse whisper, "Hark! what's that? There's somebody walking overhead!" A cold, creeping sensation seemed to go down my spine as imagination suggested to me the picture of one of those gray figures, with swollen, blackened face and ash-plastered eye-sockets, feeling its way slowly down stairs! It was impossible, and I knew that it was impossible; but the very idea seemed to chill my blood. Mr. Jaccaci appeared to be cool, observant, and perfectly

THE TRAGEDY OF PELÉE

self-controlled at all times ; but Mr. Clerc was nervously overwrought, and Mr. Varian admitted to me that those silent houses, filled with ash-plastered corpses, were the "spookiest" places he had ever seen.

Tired, faint, and sickened with the stench of dead bodies, we finally turned our faces homeward, climbed slowly up the valley over the stone-piles of wrecked houses, and drove back to Vivé.

When I went to bed that night, I found it utterly impossible to sleep. The atmosphere of the room seemed to be pervaded by a faint, corpse-like odor, and I imagined that I could see a gray ash-plastered figure with flies crawling over it in every dark corner of the room. Satisfied, at last, that the odor of death could not be wholly imaginary, I got up, struck a light, and began to examine in turn the things that I had brought back from the tornado valley. A little etched calabash that I had picked up in one of the houses of the village of Trois Ponts proved to be so saturated with the odor of a rotting corpse that it had tainted the air of the whole room. I put it

THE TRACK OF THE HURRICANE

out of the window on the roof of the piazza, extinguished my light, and again went to bed ; but I had a restless, feverish night, and began, for the first time, to regard that infernal volcano with a feeling of dread.

V
A NIGHT ERUPTION OF
MONT PELÉE

AS a result of heat, fatigue, sleeplessness, and the drinking of unwholesome, ash-contaminated water, we all felt rather weak and depressed on the morning after our return from the tornado valley of the Roxelane, and when Mr. Jaccaci, with unconquerable energy, proposed an expedition to the sub-crater of the Falaise, Mr. Varian and I had to admit that we were not physically equal to it. Varian, who was really ill, went to bed again after breakfast; and I was afraid that if I continued to expose myself, day after day, to the hot tropical sunshine, I should bring on another attack of the low malarial fever from which I had already been suffering at intervals for two or

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three years. We all wanted, moreover, to attempt an ascent of the volcano the next day, and it seemed to Mr. Varian and me that we should do better if we reserved all the strength we had for that undertaking. Mr. Clerc, however, was apparently ready if not anxious to go, and a party consisting of Mr. Jaccaci, Mr. Clerc, Mr. Chancel, and a negro journalist named Confiant, who had been spending a day or two at Vivé as a guest, started for the Falaise soon after lunch.

The sub-crater on our side of the volcano was not more than three miles and a half, in an air line, from Mr. Clerc's house; and as it was situated on one of the lower slopes of the mountain, near the old Calebasse road, it could be reached without much difficulty. We had seen white clouds of steam rising from it occasionally, but no one had yet visited it, and as it seemed that day to be absolutely quiescent, Mr. Clerc and Mr. Jaccaci were anxious to examine it more closely—partly as a matter of scientific curiosity, and partly to ascertain whether it was really a serious menace to Vivé.

THE TRAGEDY OF PELÉE

After the party had gone, I studied, through a field-glass, the ash-covered, deeply furrowed slopes of the volcano, looked now and then for signs of disturbance in the gorge of the Falaise, and watched the great volume of yellowish-white vapor which boiled up out of the main crater, rose majestically in immense cloudy thunder-heads to a height of four or five thousand feet, and then drifted slowly away to the westward under the influence of the steady trade wind.

Up to this time, May 26, we had seen nothing whatever to indicate that Mont Pelée was in a state of dangerous, or even serious, activity. Great clouds of vapor rolled up incessantly from the main crater, but they were carried away from us by the trade wind; no ashes fell; there were no rumblings or detonations; and as I sat looking at the gray, desolate mountain that afternoon, I said to myself, "Jaccaci, Clerc, and the others will have a safe trip; the volcano isn't going to do anything to-day."

The crater-exploring party returned about five o'clock and gave us a graphic description of the wild gorge of the upper Falaise, which,

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Mr. Jaccaci said, was the most impressive, frightful, and unearthly place he had ever seen, although he was familiar with Vesuvius, Stromboli, and Etna. The crater, with its deep pit and vault-like openings into the volcano, proved to be empty; but the desolate, eroded cañon in which it was situated looked like a Doré picture of the gateway to hell. I had not seen Mr. Jaccaci so roused and excited since our arrival in Martinique; and I regretted that I had not gone with the party, fever or no fever. They had evidently seen something that was tremendous, unearthly, and awe-inspiring.

When dinner was served that night, about seven o'clock, a larger company assembled than usual. Mr. Clerc's brother from Trinité had come to make him a short visit, and there were two or three other guests from neighboring plantations or from Basse Pointe. Mr. Varian came down, ill as he was, and sat with us for an hour or more, but finally had an attack of faintness, and asked to be excused, and left the room. It was then a little after eight o'clock. He had just gone upstairs when we were startled by three or four dull,

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heavy explosions — boom ! boom-boom ! boom !—like the sound of cannonading at a distance of two or three miles. Mr. Clerc shouted excitedly, “ Le volcan ! Le volcan ! ” and, springing from his seat, rushed out of doors, with all the rest of us at his heels. There were a lot of mango-trees just in front of the house, and we had to run twenty or thirty yards before we could see the volcano at all. When we got out into the open, it burst suddenly upon our startled eyes, and a more splendid and at the same time terrifying object I had never seen nor imagined. The whole mountain, from base to summit, was ablaze with volcanic lightning, and the air trembled with short, heavy, thunderous explosions, like the firing of thirteen-inch guns from half a dozen battleships in action. Straight up from the crater, clearly outlined against the starry sky, rose a column of inky-black vapor, a thousand feet in height, which looked like a shaft of solid ebony. Before I had time to breathe twice it had reached a height of two thousand feet ; in thirty seconds it had grown three thousand feet more, without the least increase in width ; and in less

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than two minutes it stood ten thousand feet above the crater and was still going up. In every part of this ascending column of black vapor there were bursting huge electric stars of volcanic lightning, which illuminated the whole mountain, while the accompanying roar of thunderous explosions sounded like a great naval battle at sea.

I was so absorbed in the magnificence of the spectacle that I had no consciousness of my situation, and did not even notice what was going on about me until I heard Mr. Clerc shout in English, "Gentlemen, it is time to go! This is a dangerous place! We will go to the house of my good friend at Acier!"

Recalled suddenly by Mr. Clerc's voice to a consciousness of my environment, I looked around and found myself in a throng of fugitives, servants, hostlers, laborers from the sugar mill, and employees of the estate generally, who had rushed out of their houses or run into the yard from the road at the first alarm, and were staring at the volcano in what seemed to be a daze of bewilderment and terror. Mr. Clerc's excited cry, "Gen-

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“Flemen, it is time to go!” and a hasty order which he gave in French to his overseer, Mr. Chancel, roused the silent crowd from its stupor of amazement and threw it into a panic of excitement and fear. Everybody rushed in one direction or another, and the yard instantly became a scene of the wildest confusion. Fugitives from Ajoupa Bouillon and Basse Pointe, who had stopped at Vivé to rest or bivouac, broke into headlong flight; employees of the estate rushed away to their houses, calling loudly to their wives and children as they ran; Mr. Chancel and three or four hostlers started for the stable to get a horse or saddle-mule for Mademoiselle Marie; Mr. Clerc remembering that Varian was ill, but forgetting his name, ran into the house and shouted up the stairway, “Mr. Artist! Mr. Artist! It is time to go!” and the thunderings of the volcano, the shouts of excited men, the barking of dogs, the wailing of frightened children, and the shrill cries of half-frantic women made up a tumult that was enough to shake the coolest self-possession.

I wavered for a moment, took another

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look at the tremendous lightning-shot pillar of black cloud over the crater of the volcano, remembered St. Pierre and the ash-plastered bodies of the dead in the tornado valley of the Roxelane, and made up my mind that, in the words of Mr. Clerc, it was "time to go." I cannot remember whether I said anything to Mr. Jaccaci and Mr. Varian or not. We were all half dazed, ourselves, by the suddenness of the eruption and the frightful appearance of the volcano, and there was no time or opportunity for consultation as to the best course of action. Mr. Clerc had virtually taken command with the shout "It is time to go!" and I felt no disposition to question his judgment or dispute his authority. I determined, however, that I would not go without my note book and camera. I had left them upstairs in my bedroom, and, as I remembered exactly where they were, I found them without difficulty, even in the darkness; but I could not possibly find my cork helmet. I therefore caught up a mackintosh that happened to be hanging over the back of a chair, and threw it across my arm, with the idea that if volcanic stones or hot

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cinders should begin to fall I could fold it up into a sort of cushion and use it as a protection for my head. That volcano had already thrown stones large enough to kill into the yard of the Military Hospital at Fort de France, fifteen miles away ; and I didn't want to be caught out in the open bareheaded. I had only slippers on my feet, but there was no time then to look for, or put on, shoes.

When I got back into the yard, after an absence of about a minute and a half, the crowd had somewhat diminished ; but Mr. Jaccaci and Mr. Varian were still there and Mr. Clerc and Mr. Chancel were just putting Mademoiselle Marie on a horse. I ran out beyond the mango trees to take one more look at the volcano. A dull red glow, streaked with what seemed to be tongues of flame, rose two or three hundred feet above the main crater, forming a fiery base for a shaft of intensely black vapor, ten or twelve thousand feet in height, which had already begun to mushroom out at the top. Showers of incandescent stones were falling over the summit of the mountain, and the vapor-column was pierced incessantly by short streaks of

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volcanic lightning, which seemed to end in explosive electric stars of blinding brilliancy, like huge sparks from a gigantic Leyden jar. There was no rolling, reverberating thunder, but every starlike outburst at the end of a lightning streak was followed by the dull, heavy jarring explosion of a thirteen-inch gun; and as the stars were flashing out constantly in every part of a vapor-column two miles high, the roar was like that of a continuous cannonade.

While I was looking at the volcano, Mr. Varian ran back into the house to get his sketch books. When he returned Mr. Jacacci called to me and we left the house, I think, together. I cannot remember how I got out into the road, but I have an indistinct recollection of stumbling through a cane field behind somebody with a lantern, and then falling into a gully as a result of trying to run away from the volcano and at the same time look back at it. When we finally came out on the highway, two or three hundred yards from the house, we found ourselves in a stream of fugitives from all the surrounding country who were running rap-

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idly in the direction of Grande Anse. I heard occasionally an exclamation of "Oh, mon Dieu!" from some frightened woman, but, as a rule, both men and women fled in silence, never stopping or looking behind them.

At the top of the first ascending slope in the road, about a quarter of a mile from Vivé, I stopped for an instant to recover my breath and look again at the volcano. The mushrooming cloud of vapor was then moving swiftly eastward, opening out like a huge black fan as it advanced, and its sharply defined edge had almost reached the zenith. The volcano itself was still ablaze with lightning, and the star-like bombs were bursting around the crater, in the black pillar of cloud that rose from it, and in every part of the inky canopy overhead. The thunderous explosions, the incessant flashing out of brilliant meteoric stars, the dull red glow at the base of the ascending vapor-column, and the shower of incandescent stones and cinders, streaking with fire a background of impenetrable gloom, made up an exhibition of infernal energy that, to one who had seen St.

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Pierre, was simply appalling. It looked like the end of all things.

As the great blazing, thundering tide of black vapor rolled eastward it blotted out the constellations, one after another, until there was left only a streak of clear sky, ten or fifteen degrees in width, along the southern horizon. It was then much darker than when we left Vivé, but the brilliant flashes of stellar lightning in the volcanic mantle overhead illumined the gray, ash-covered road, so that we had no difficulty in finding our way, so long as we did not look upward. But I wanted to look upward most of the time. The lightning was so extraordinary, and so different from anything I had ever before seen, that I stumbled along, with upturned face, watching the play of the short, quick flashes, and the star-like outbursts with which they ended, until my eyes were so dazzled that I could not see the man who was running beside me, much less the horse of Mademoiselle Marie, ahead. Jaccaci, Varian and I tried to keep together ; but there was a stream of fugitives in the road, and in the darkness, confusion and excitement we sometimes became sepa-

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rated. A shout, however, of "Jaccaci! Varian! Where are you?" always brought the cheery reply, "Here we are; all right!" From Clerc and Chancel, who were running ahead beside the horse of Mademoiselle Marie, we heard nothing, and I had not the faintest idea where they intended to go; but I presumed we were all bound for the house of the "good friend" at Acier where Mr. Clerc had been spending his nights.

The evening was intensely close and hot, and I feared that Varian, who had been ill all day, would faint or collapse before we could reach a place of shelter; but he showed no sign of distress, and said, in reply to every inquiry, "Oh, I'm all right." Mr. Jaccaci, who was apparently the least excited man in the party, tried at intervals to encourage and quiet the panic-stricken fugitives who were hurrying along the road beside us; and when, after an unusually brilliant outburst of stellar lightning, or a terrifying explosion overhead, some frightened native woman began to whimper, or cried distractedly, "Oh, mon Dieu! mon Dieu!" he would say, "Cheer up, mother! It's nothing serious. Dangerous?"

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Not a bit; nothing is going to hurt you," and the reassured woman would trudge along quietly, more comforted than if a dozen paper chromo-lithographs of the Martinique Madonna had been pinned over her heart.

If some scientific investigator of volcanic phenomena should ask me how much time the black vapor-cloud occupied in going from the crater to a point vertically over the seacoast at Grande Anse, and how long we were running or walking on the road east of Vivé, I should have to make a random, untrustworthy guess. Time and space did not register in my consciousness; and all that I am now able to say is that, when we climbed the last hill and found ourselves among the big trees in front of the old colonial mansion of Acier, stars of volcanic lightning were still bursting not only in the black canopy above our heads, but far east of us, over the ocean, at a distance of at least seven miles from the crater.

We reached shelter just in time to escape a shower of ashes and small, hot volcanic stones, which began to patter down, like sleet,

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through the leaves of the trees as we burst in at the side door of the dark and empty house. I fortunately happened to have a box of matches in my pocket, and scratching one on the door I lighted a bit of a candle that I found on the dining table. The room instantly filled with fugitives—mostly negroes—who had come with us or preceded us, and as their faces and figures took form and color in the light of that flaring candle-end, it was evident that this was one of the occasions when birds that are *not* of a feather flock together. It would have been hard to find, that night, in all Martinique, a more heterogeneous roomful of people. At Vivé we had been gentlemen, guests, servants, sugar-mill hands, Hindoo coolies, negro women, and a lady. At Acier we were simply a lot of tired Pelée fugitives. I looked vainly for Mr. Clerc, his brother Josef, and the negro journalist, Confiant, who sat next me at dinner. All had gone on in the direction of Grande Anse, and the journalist, who had lost twenty-eight relatives in St. Pierre, fled fifteen miles down the eastern coast before he finally stopped at Trinité. The owner of

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the mansion where we were, had run away with all his servants, long before we arrived ; and as we subsequently learned, there had been a general stampede, and that this general stampede of many frightened people had extended not only from Vivé to Acier, but also from not a few villages and towns as distant as Grande Anse, Marigot and St. Maria.

When we reached the house at Acier, we were tired, breathless, and dripping with perspiration ; but Mr. Chancel found some rum in a wine-closet, and after taking a " bracer " of that fiery stimulant and resting a little, I felt sufficiently revived to go out into the yard and look once more at Mont Pelée. It was then pitch dark. The electric stars had ceased bursting overhead ; the glow above the crater had disappeared, and the volcano had wrapped itself in a shroud of impenetrable gloom. A storm, however, seemed to be raging above it, and the bolts of smoke-red-dened lightning which shot down upon it at intervals were followed by long peals of rolling, reverberating thunder.

When I returned to the dining-room,

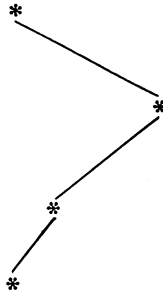
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Mademoiselle Marie had taken charge of the house ; found and lighted a lamp ; sent the negroes to the kitchen ; and was getting bedrooms ready for us in the second story. Varian, who was feeling the chill of wet underclothing and the reaction from excitement and fatigue, soon went upstairs to bed ; and while Mr. Jaccaci was discussing the volcano with Mr. Chancel, I sat down at the table to write up my notes.

The feature of the eruption that made the deepest impression upon me was the stellar lightning. The uprush of black smoke, the glow over the crater, and the shower of incandescent stones and cinders were all phenomena that had been observed and described before ; but the short, thin streaks of lightning followed by star-like explosions in the volcanic mantle—not only above the crater, but miles away from it—were entirely new. The distinctive characteristics of this lightning were the shortness of the streak, the comparatively great size and brilliancy of the spark, or light-burst, at the end of the streak, and the single booming report that followed. Sometimes three or four great sparks, con-

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ned by fiery streaks, would flash out together in this way :



and at other times the stars would burst so far back in the cloud that the streaks were invisible and there was only a circular irradiation of the vapor. If there was any storm lightning of the ordinary kind in the earlier stages of the eruption, it was so much less noticeable than the stellar lightning that it escaped my observation ; and I am quite sure that there was no rolling, reverberating thunder at all until near the close of the display, when reddish lightning-bolts began to dart down on the volcano from the developing storm-cloud over the crater. Before that time all, or nearly all, of the electric discharges had ended in stellar light-bursts, and all of

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the thunder had been made up of separate and distinct reports, like the thunder of a heavy and rapid cannonade.

The general effect of the stellar lightning was that of a short, thin electric discharge striking and igniting a pocket of inflammable gas in the cloud of volcanic vapor. I am not at all sure, however, that the star-like explosions were caused in this way. It is hard to observe accurately in a time of such excitement ; but I am almost sure that the stellar light-bursts were sometimes *wholly outside* of the volcanic mantle. It might possibly be worth while to ascertain whether any such effects as these can be produced in the laboratory by sending an electric discharge of high tension through hot air or steam densely charged with fine rock-dust. It hardly seems possible that there could have been isolated, discrete pockets of inflammable gas in that volcanic cloud, seven miles away from the crater ; and if not, the phenomenon must have been wholly electrical.

This stellar lightning, in connection with a volcanic eruption, has been observed, I think, before ; but it does not seem to have

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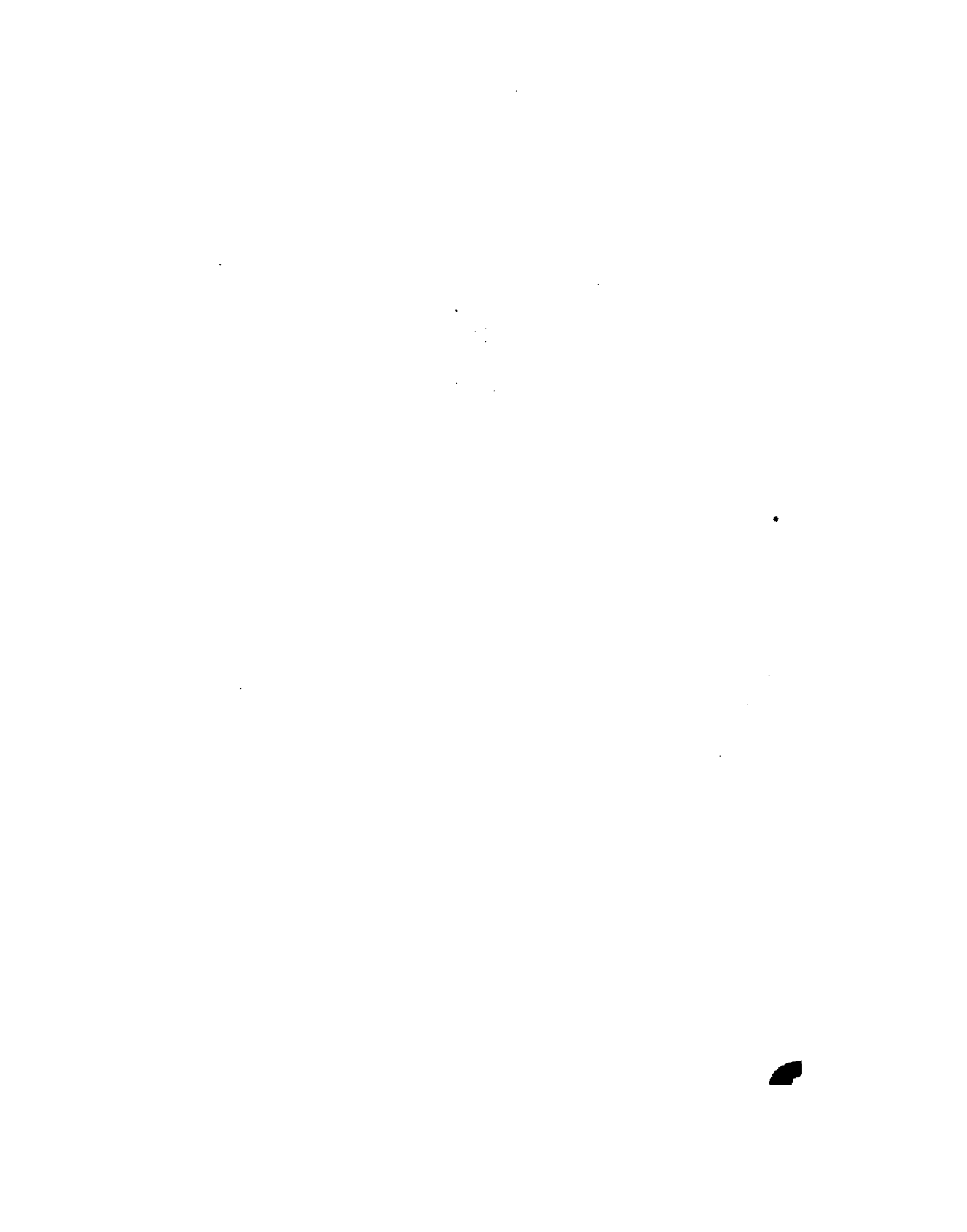
been commented upon or investigated. Captain Watson, of the British ship Charles Bal, saw what he afterward described as a "continual roll of balls of white fire" over Krakatoa, when he was twelve miles off that volcano, during the night eruption of August 27, 1883; and "fire-balls" were seen in the vapor of the New Zealand volcano Tarawera in 1886. Finally, the Japanese geologist Kikuchi, of the Imperial University of Tokyo, reports that in the great eruption of the Japanese volcano of Bandai-san in 1888, "the people of Inawashiro and the neighboring villages saw, through the falling ashes" (in the daytime), "*innumerable vivid sparks of fire* on the slopes of Obandai and Akahani, at considerable distances from the crater. These sparks were quite different in nature from lightning, presenting rather an appearance as of the *firing of innumerable guns.*"

There can be little doubt, I think, that these "vivid sparks," which were bright enough to be seen by the inhabitants of several villages at a distance of two or three miles in the daytime, were precisely such star-like outbursts as we saw on the night of May 26

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in the vapor of Mont Pelée. When I rushed out of doors, at the beginning of the eruption, the first impression made upon my mind was that brilliantly white meteors were being thrown out of the ascending vapor-column in every direction—sometimes upward and sometimes downward toward the slopes of the volcano. But this observation is not wholly trustworthy. All I am sure of is that the whole volcano seemed to be ablaze with these electric stars, which suggested both meteors and huge sparks from a gigantic Leyden jar.

At eleven o'clock, when I finished writing up my notes of the eruption and again went out of doors, the black cloud overhead was growing perceptibly thinner, and seemed to be drifting away to the northward. Mont Pelée was still wrapped in dark vapor, but there were no lightning flashes over the crater; no sound of any kind came from that direction, and the volcano had apparently suspended operations. When I returned to the house, Mr. Jaccaci, who had seemed for an hour to be more than usually thoughtful and moody, said to me, "What do you think about going back to Vivé?"





AN ERUPTION AS SEEN FROM THE CHURCH AT MORNE ROUGE

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“ Now—to-night ? ” I inquired.

“ Yes ; as soon as it gets light enough.”

“ I don’t see any particular use,” I said, “ in going back to a place we’ve just run away from. Shan’t we be comfortable here ? ”

“ Oh, yes,” he said, “ I suppose so ; but I don’t like this running away from things. Besides that, somebody ought to look after Mr. Clerc’s house. We simply abandoned it, leaving all the doors open, and it might be looted.”

“ So far as the running away is concerned,” I replied, “ I haven’t a bit of feeling, and I don’t see why you should have. If you were in a deep valley and saw a Johnstown flood coming down on you, wouldn’t you get out of the way if you could ? ”

“ Yes—probably—but if you and I and Varian had been alone at Vivé we should have stood our ground. It was Clerc and the others who stampeded us. I hate to do anything that has to be explained.”

“ Well, Field Marshal,” I said laughingly, “ if you’ll just describe, in your eloquent way, what we *saw*, I don’t think anybody will ever call for an explanation of what we *did*.”

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However, if you want to go back to Vivé to-night, I'm with you. My underclothing is all wet; I'm getting chilly; and I'd like a bath and a change, anyway."

At half-past eleven it was light enough to see the road, and Mr. Jaccaci, Mr. Chancel and I started back on foot. When we reached Vivé, just before midnight, we found a crowd of silent, terror-stricken fugitives huddled close together in the shelter of the house, at the end of the piazza that was farthest away from the volcano. Somebody had put out the lights on the dining table and closed the doors, and nothing seemed to have been disturbed.

We went to our rooms, refreshed ourselves with a bath, a medicinal dose of rum, and a smoke, and had just gone to bed when we heard footsteps on the stairs, and, to our great astonishment, in burst Mr. Clerc. He looked tired and anxious; his wet hair was plastered down over his forehead; and he was evidently excited.

"Well, gentlemen," he said, "*wasn't* that an explosion! Ai! ai! ai! I've come back with two carriages to take you away."

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"Thank you," said Mr. Jaccaci, coolly; "we don't want to go away."

"But you can't stay here!" he cried excitedly; "it's dangerous! You don't know what that volcano is going to do. I've seen four explosions—*four!*" (holding up four fingers to me) "and I don't want to see any more—God forbid! But I've come back after you."

"We're very comfortable here," said Mr. Jaccaci, "and I'm not going to get up again to-night—volcano or no volcano."

"But, gentlemen!" expostulated Mr. Clerc, "you don't understand. This is serious—*very* serious! Vivé is a dangerous place. You don't know what may happen to you before morning."

Mr. Jaccaci still refused to get up, and I felt satisfied that nothing short of a Krakatoa explosion would drive him away from Vivé again that night.

"Well, gentlemen," said poor Mr. Clerc at last, "you are my guests. I feel responsible for your safety, and I have come back here, after midnight, with two carriages, to take you to Trinité. You won't go, and I

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can't do any more. I've warned you, and you must do as you think best. If you stay, I shall have to bid you good-by. I am going, myself, to Fort de France."

We thanked him most cordially for his warm-hearted hospitality, for his kindness, and for the courage and devotion that he had shown in coming back after us, but told him that we had come to Martinique to study that volcano, and we didn't care to run away from it twice in one night. He shook hands with us, wished us good luck, bade us good-by, and started for Trinité. A few days later he went to Guadeloupe after his family, and sailed thence, by the first French transatlantic steamer, for Havre. The conditions of life on the island of Martinique had become, as he said, "impossible."

We got through the night at Vivé without an alarm, and at half-past six the next morning we were joined by Mr. Varian and Mademoiselle Marie, who, also, had decided to return.

The volcano was in a state of intense activity and looked extremely threatening and dangerous. The vapor had all cleared

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away from its slopes, and the high arête at its northern end was covered with a fresh fall of very white ashes which looked, in the sunshine, like snow, and gave that part of the mountain an appearance that was almost arctic. Immense volumes of dark yellow mud-smoke were boiling out of the main crater and rolling up in vast convolutions to a height of five thousand feet, against a tremendous black background of falling cinders and ashes.

Mademoiselle Marie succeeded in getting together the materials for a cold breakfast, and we made a strenuous effort to take a hopeful and cheerful view of life; but the menacing shadow of Mont Pelée was over us all. About nine o'clock Mr. Jaccaci, who had been knocked out by the hard experience of the previous night, went to bed, seriously ill; Mr. Varian soon followed his example, and I was left to commune with that infernal volcano alone. How many times I went out to look at it in the course of the next three or four hours I don't know, but at least twenty. It was covering the whole western sky with dark yellow mud-clouds

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and black showers of falling ashes, and seemed to me more threatening and terrifying than ever. Before noon I had become so wrought up by anxiety and nervous strain that my imagination began to run away with me, and I suddenly felt a vague but overwhelming premonition of some impending catastrophe. Going to Mr. Jaccaci's bedside I said to him: "If you feel able to get up, I wish you'd come and look at this volcano." He walked feebly to the side window in the upper story of the house, gazed fixedly at the volcano for fully a minute and then said: "It looks as Vesuvius must have looked five minutes before the destruction of Pompeii. If you want to get out of this, I'm ready to go."

"I've been wanting to get out of this," I said, "for the last four hours. The thing is getting on my nerves. If you and Varian feel able to ride I'm in favor of leaving here at once."

We summoned Mr. Chancel, held a volcano-council, and decided to close the house and seek a safer place of abode. Ox-carts were brought to the door; mattresses, bed-

A NIGHT ERUPTION OF PELÉE

ding, personal baggage, table-linen, wine, food, and such other things as we were likely to need were put into them, mules were harnessed to a light double carriage, and we all started for Acier, leaving Vivé to its fate.

VI
ACIER AND THE CALE-
BASSE ROAD

IT would be hard to find, in all the islands of Martinique, a country place that is more beautifully situated than the old colonial mansion of Acier. When we rushed into it, on the night of the eruption of May 26, darkness prevented us from getting any clear idea of its location or environment; but when we returned there, the next afternoon, we all agreed that a more picturesque and commanding site for a house could hardly have been found along that coast. Morne Jacob, one of the outlying foothills of the Carbet group of peaks, throws out on its northern side, toward the Domenica channel, a number of long sloping ridges, or buttresses, separated one from another by deep

ACIER — THE CALEBASSE ROAD

ravines. High above the sea, near the end of one of these buttresses, stands Acier — a two-story, West Indian house of yellow-washed stone rubble, whose irregular roof is broken by small unglazed dormer windows, and whose wide front door opens on a narrow piazza, and then upon a grassy yard shaded by century-old trees. A low stone wall bounds the yard on two sides, and beyond this wall the ridge descends so abruptly as to afford an almost unobstructed outlook over the dark-blue ocean, and a magnificent view of Mont Pelée from Morne Rouge to Macouba, and from the valley of the Capot to the high smoking crater. Our first sight of Acier by daylight showed us that the house and yard had suffered much less from volcanic ashes than had the house and yard of Mr. Clerc. There was a deposit of gray, powdery dust on the floor of the piazza, as well as on the foliage of the trees; but only a few leaves had fallen, the grass in the front yard was still green, and flowers were blossoming in an adjacent garden.

As the owner of the mansion and his family were still absent, we moved in and took pos-

THE TRAGEDY OF PELÉE

session, almost as unceremoniously as we had taken possession the night before. It was an indefensible course of procedure, perhaps, but Mr. Jaccaci and Mr. Varian were not at all well and we *had* to have some place to stay. Besides that, if a man runs away and abandons his house he must expect that it will be treated as a derelict. We therefore carried in our bedding and food, set the rooms in order, lighted a taper before a life-sized chromo-lithograph of a Madonna with sword-pierced heart in the upper hall, put a fresh cloth on the dining table, kindled fires in the kitchen charcoal-braziers, got luncheon, and when, a little later, Mr. M——, the owner of the estate, came back to see what had happened to his abandoned property, we were fully prepared to take him to board, as a homeless fugitive, and give him the best we had in the house. He looked rather surprised — not to say dazed — when he found us in full possession of the premises ; but a few words from Mr. Chancel and Mademoiselle Marie cleared up the situation, and he begged us courteously to make ourselves perfectly at home.



ACIER—THE CALEBASSE ROAD

Mont Pelée continued very active all the afternoon. Dense clouds of dark yellow mud smoke rose incessantly from the main crater, and the sky, behind the ascending vapor-column, was one vast black sheet of falling ashes; but we no longer felt apprehensive. Acier, although only a little farther away from the volcano than Vivé, was much safer than the latter as a place of residence, on account of its topographical situation. Vivé was so low that it might be overwhelmed by a tidal wave, or swept into the sea, as the Guérin sugar-mill had been, by a flood of mud and water from the gorge and Falaise; but Acier was not menaced by either of these dangers. Falling stones might reach us, or, if the volcano should split open on the eastern side, we might be struck by such a blast as the one that destroyed St. Pierre; but these were extremely remote possibilities and gave us no uneasiness.

Jaccaci and Varian spent most of the afternoon in bed; but after dinner they began to feel better, and we all went out and sat in rocking-chairs on the lawn, watching the volcano, listening to the faint intermittent roar

THE TRAGEDY OF PELÉE

of the surf, and enjoying the cool freshness of the gentle trade-wind. The twenty-four hours had made almost as great a change as could possibly have been made in our feelings and our environment. Monday night we were rushing, panic-stricken, away from Vivé, under a black cloud that blazed with volcanic lightning and shook the air with the thunder of a heavy cannonade. Tuesday night we sat comfortably in rocking-chairs on the lawn of a pleasant country house, smoking, talking, and paying little more attention to the volcano than to the fireflies that flashed their tiny lamps in dark recesses of the shrubbery, or the bats that swooped and wheeled noiselessly over our heads. Mont Pelée, however, was slowly gathering its energies for another outburst.

Wednesday morning dawned cool and clear, and when I went out of doors, about six o'clock, I could see nothing to indicate a renewal of volcanic activity. A cloud of yellowish-brown smoke was drifting away from the main crater, but it did not rise to a great height, and looked much less threatening than on the previous day. After breakfast,

ACIER—THE CALEBASSE ROAD

however, this cloud began to extend southward toward St. Pierre, as if the crater were widening in that direction; and about nine o'clock there was a sudden and tremendous outburst of dark-yellow vapor, which looked almost like a colossal geyser of liquid mud. I watched it as it swiftly ascended to a height of four or five thousand feet, and then ran into the house to get my camera. When I returned to the yard the huge vapor-column had reached a height of ten thousand feet and was still going up. Every part of it was rolling, boiling, and unfolding in multitudinous convolutions, and its clearly defined top looked like an immense growing cauliflower, eight hundred or a thousand feet across.

Without a single rumble or detonation to indicate the Titanic power of the agency at work below, the great column of dark vapor rushed swiftly upward until it was more than three times the height of the volcano itself. Then, for a moment, it seemed to rest. The whole sky, at that time, was perfectly clear, and the gigantic pillar of cloud, standing nearly three miles vertically above the crater

THE TRAGEDY OF PELÉE

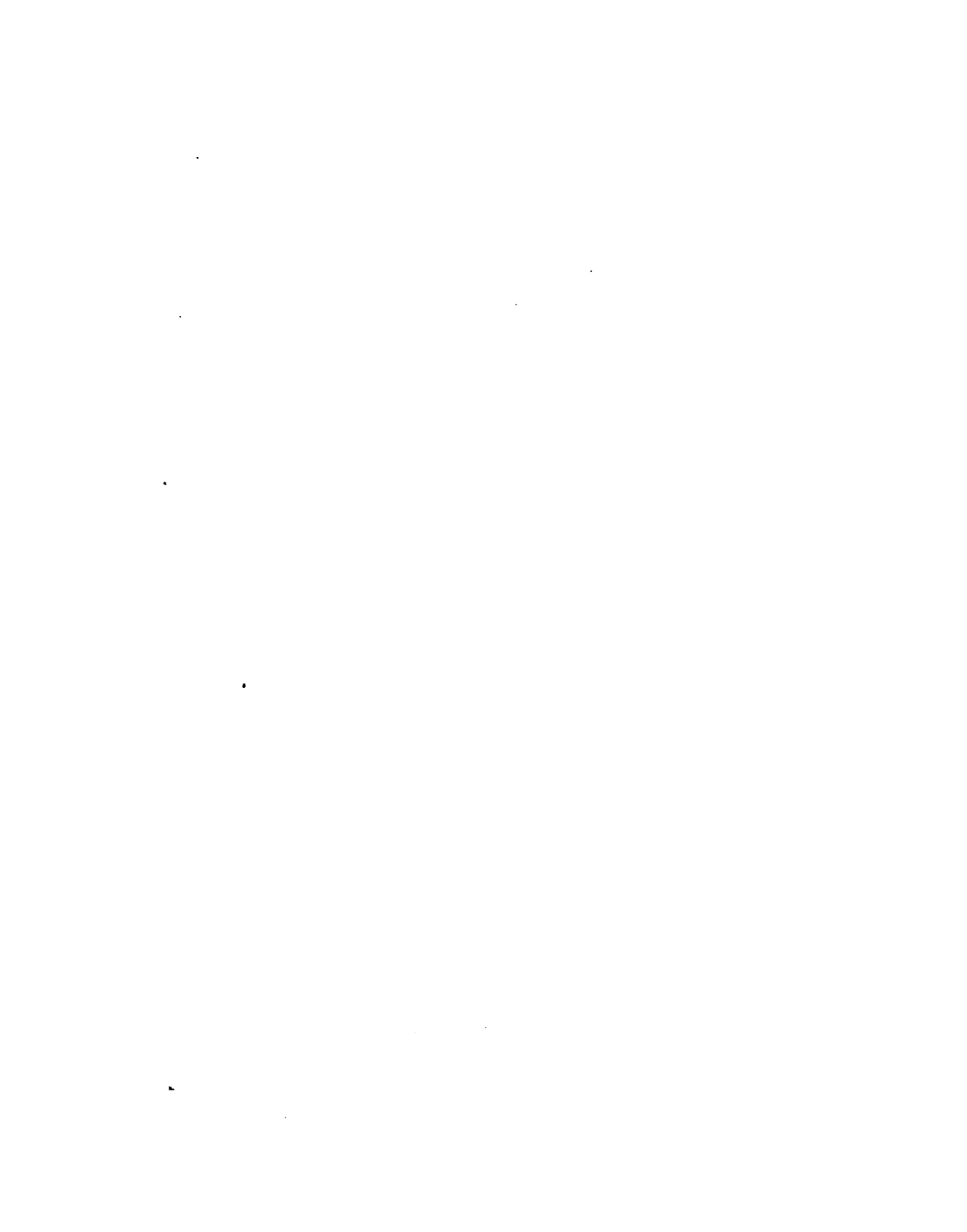
2. The vapor of moderate activity—a column of greater density and somewhat darker color, which rolls and unfolds a little as it rises, and looks like steam mixed with brownish or yellowish smoke from a chimney of a manufactory.

3. The vapor of dangerous activity—a sharply defined, dark-yellow column of what appears to be liquid mud, which boils out of the volcano in huge rounded masses, swelling and evolving in immense convolutions as it rises—one gigantic mud-bubble breaking up out of another in turn—until over the crater there stands a solid opaque pillar of boiling, unfolding, evolving mud-vapor, five hundred feet in diameter and eight or ten thousand feet in height.

4. The vapor of great eruptions—a straight-sided shaft of very black smoke, which shoots up out of the crater with tremendous velocity, like the smoke of a colossal piece of artillery fired heavenward. This shaft goes to a height of fifteen or twenty thousand feet, and then mushrooms out laterally so as to cover a circle fifty miles or more in diameter with a volcanic canopy which is as dark as the black-



MONT PELÉE FROM VIVÉ ON MAY 27



ACIER—THE CALEBASSE ROAD

est thunder-cloud and which shuts out the light of day like a total eclipse. The projectile force, in eruptions of this kind, is so great that it throws the black vapor far above the influence of the trade-wind, and the advancing edge of the volcanic mantle moves swiftly eastward, two miles or more above the fleecy trade-wind clouds that are drifting in the opposite direction.

It would be natural enough, perhaps, to suppose that the volcano, in its varying phases of activity, throws out vapor of different kinds—at one time pure white steam, at another time steam mixed with smoke, and in a great eruption inky-black smoke of the sootiest kind ; but such is not the case. A volcano never emits true smoke—that is, air laden with particles of unconsumed carbon—at any time ; and ninety-nine per cent. of the vapor that rises from Mont Pelée is pure steam. When this steam is wholly free from solid matter, it looks white ; but as it becomes more and more heavily charged with the fine dust of pulverized rock, it acquires greater and greater apparent density, and changes its color from pure white to yellow-

THE TRAGEDY OF PELÉE

ish-white, then to a dark muddy-yellow, and finally to brownish-black and the deep threatening black of a hurricane or tornado cloud. The form as well as the rate of movement of the ascending vapor-column seems to depend upon the manner in which the steam makes its escape from the hot interior of the volcano and the projectile force of the subterranean explosions. The finely divided matter which gives density and color to the column of steam is volcanic dust—a grayish powder, like Portland cement, which is nothing more nor less than rock that has been ground up in the vast subterranean mortar of the volcano, or, as seems more likely, blown into minute fragments by the expansive force of hot aqueous vapor suddenly released from immense pressure. In describing Mont Pelée and the results of its activity, I have sometimes used, and may continue to use, the words “smoke” and “ashes;” but it must steadily be borne in mind that the volcano ejects neither the one nor the other. What looks like smoke is steam charged with dust, and the dust which looks like ashes is powdered rock.

ACIER—THE CALEBASSE ROAD

As it was manifestly impracticable to ascend the volcano while it continued so active, and as there seemed to be nothing else to do on the Acier side, we drove Thursday morning to Morne Rouge, where we expected to get the statements of a number of persons who witnessed the fatal eruption of May 8, and where it might be possible to make an ascent, if the volcano, later in the week, should quiet down.

Father Mary, who seemed very glad to see us again so soon, took us into the refectory, set before us a cut loaf of brown bread, a bottle of Martinique rum, spoons, sugar and a saucer of green limes, and began at once to talk about the eruption of the previous Monday night—the night that we fled from Vivé. The American newspaper correspondents, he said, reached Morne Rouge from Fort de France by the Trace road late Monday afternoon, and were just finishing their dinner, at his table, when the eruption began. Terrified by the lightning, the shower of incandescent cinders, and the glow over the crater, they abandoned their cameras, their horses, and all their personal baggage, and

THE TRAGEDY OF PELÉE

fled in the direction of the Carbet peaks. What happened to them afterward he did not know; but he heard from some of the natives that they returned to Fort de France the next day on foot.

Tuesday noon another American correspondent, named Kavanaugh, came into Morne Rouge from the south on horseback, and, shortly after lunch, made an attempt to ascend the volcano alone. He came back in a state of complete exhaustion about three hours later, and after the eruption on Wednesday morning he also returned to Fort de France. How high he had succeeded in getting on the mountain, Father Mary could not tell us. Mr. Robert T. Hill, of the United States Geological Survey, started for Morne Rouge with Kavanaugh, but for some reason failed to get through, and the curé understood that he had gone back. We were very sorry to miss seeing all these Americans, and especially Mr. Hill, who had come to Martinique with us on the Dixie; but it was some satisfaction to feel that although we, too, had been stampeded by the night eruption of the 26th, we were still in the field.

ACIER — THE CALEBASSE ROAD

As the volcano on the morning of Friday, May 30, seemed to be quiescent, Mr. Jaccaci and I determined to make an ascent. We had little expectation of reaching the main crater, but there seemed to be no reason why we should not get as high, at least, as the crest of the old Calebasse road, from which we could look down into the crater of the Falaise, and if all the conditions should prove to be favorable, we might perhaps find it practicable to go higher. Mr. Varian was very anxious, of course, to accompany us ; but as he had made a second trip the previous afternoon into the valley of the Roxelane, and had come back in a state of complete exhaustion due to heat, fatigue, and the sickening stench of dead bodies, we thought he ought to give himself at least one day of rest.

In order to save our strength as much as possible, we drove from the church to the junction of the Vivé road with the Calebasse, and, leaving our carriage there, started up the mountain with a native guide, carrying only cameras, field-glasses, a bottle of water, and a big slab of chocolate. The ascent for the first half-mile was very easy ; but at a height of

THE TRAGEDY OF PELÉE

about two thousand feet we were caught in a heavy shower, which so softened and loosened up the ashes as to make the walking difficult and tiresome.

The scenery, as we approached the top of the long arête, became extremely wild, gloomy, and desolate. The mountain slopes were covered to a depth of a foot or more with gray ashes; the trees in all the ravines at our left were bare and apparently dead; the leafless bushes that bordered the path had been so broken and matted down by ashes, cinders, and heavy rain that our guide frequently had to cut a way through them with his machete, and over the whole mountain was the stillness of universal death. I saw no living thing except a solitary land-crab, which seemed to be making its way down out of that region of fire, floods, lightning, ashes, and Plutonian desolation.

Quiescent as the volcano had seemed when we left Morne Rouge, it did not fail to give us, at intervals, indications and reminders of its eruptive capabilities. Just before we reached the huge black knob that breaks the symmetrical slope of the mountain

ACIER—THE CALEBASSE ROAD

on the Morne Rouge side, steam began to rise from a deep gorge about half a mile away on our left, and ten minutes later there was a great uprush of brownish vapor from a mud-slope in the valley of the Rivière des Pères, or the Roxelane, followed by a roar like that of a big waterfall. Near the point where the old route to the main crater leaves the Calébasse road, at a height of about three thousand feet, fine ashes began to blow in our faces from the other side of the divide, and we noticed for the first time a strong, peculiar odor, which reminded me of the smell of a blacksmith shop when fresh coal has been put on the smoldering fire and the smoky products of imperfect combustion escape into the room. When we smelled that odor and ashes began to fall on us, we knew that we must be getting into the neighborhood of the Falaise crater. We were so high that trade-wind clouds from the Atlantic were constantly eddying about us, half hiding and then half revealing gray, broken skeletons of trees, drifts of volcanic dust, cinders, boulders, and the blackened remains of tropical thickets which looked as if

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they had first been swept by fire and then half buried by a heavy sleet-storm of wet ashes.

A walk of five minutes more brought us to the highest part of the Calebasse; and stopping suddenly on the brink of a precipice, we looked down into the wild, gloomy, unearthly gorge of the Falaise—a chaos of tremendous cliffs, landslides, enormous volcanic boulders, blackened forests, and narrow eroded channels, hundreds of feet in depth, through which were tumbling torrents of steaming water or hot mud. A great cloud of yellowish-brown smoke was rising from the crater, a thousand feet below, and all up and down the bottom of the gorge we could see uprushes of steam from fumaroles or from water coming into contact with masses of hot volcanic material that had suddenly caved away from the precipitous bank and fallen into the stream.

The distinctive characteristic of the whole scene was its absolute unearthliness. The wildness and ruggedness of the contours; the absence of all colors except white, gray, and black; the sudden and mysterious up-

ACIER—THE CALEBASSE ROAD

rushes of steam or smoke; the faint haze of falling dust; the storm-clouds that eddied around us and deepened the gloominess of the gorge; the drifts of volcanic ashes in the foreground, and the immense gray mass of the mountain, rising to unknown heights in the thick mist overhead, made up a picture that had no parallel in my experience. It might have been a scene from a Dantesque Inferno, or a glimpse of another planet in one of the formative stages of development, but it was like nothing terrestrial.

We felt more than half inclined to descend into the gorge and see what the Falaise crater was actually doing; but the weather looked very threatening; a sudden roaring sound from the steaming abyss below warned us that it was by no means a safe place to be during an eruption—or even in a severe storm—and we finally decided to call it a day's work and return to Morne Rouge. The whole summit of the volcano was enveloped in dense clouds, so that there was no possibility of reaching the main crater that afternoon, even if we were prepared to attempt it. It was still a

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thousand feet above us, and nearly a mile away.

I wrote a brief record of our ascent, and placed it in the cleft of a split pole, which I planted in the ashes at the highest point reached on the Calebasse divide, and, after taking one more look at the gloomy gorge, we started homeward. Another heavy tropical rain-storm caught us on our way down, but we fortunately had no streams to cross, and reached Morne Rouge in safety about three o'clock. We found the parish house filled with the pungent smell of phenic acid, which Father Mary said he had sprinkled over the floor to counteract or overpower a faint odor of dead bodies that came up from the valley of the Roxelane.

Early in the evening the clouds broke away from the top of the volcano; a faint glow of subterranean fire lighted up the vapor-column over the main crater, and we heard two or three rumbling detonations, but nothing happened. About nine o'clock a vessel somewhere off St. Pierre—probably a French cruiser—threw a powerful searchlight on the mountain, and illuminated the summit so that

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we could distinctly see the V-shaped gorge just below the crater on the southwestern side, and even the movements of the smoke as it rolled up and drifted away on the light trade-wind in the direction of Prêcheur. Then the piercing shaft of radiance swept down the mud-slope of the Rivière Blanche to the site of the Guérin sugar-mill; shifted to the ruins of St. Pierre, and finally vanished, leaving the mountain dark as before.

VII
CLIMBING THE VOLCANO

MONT PELÉE showed no signs of dangerous activity Saturday morning, and, as we had done all that we expected to do at Morne Rouge, we decided to return to Acier and make an attempt to reach the main crater by way of the Morne Balais arête, which all the natives said was a better and easier route than that up the Calebasse. After taking a photograph of Father Mary—one of the bravest and most devoted priests in all Martinique—we bade him good-by, climbed into our carriage, and started down the long, sinuous road that leads to the valley of the Capot. At the mouth of the Falaise gorge we found that the high stone bridge over the stream had

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been turned into a dam. A torrent of mud and water had carried down upon it an immense mass of ashes and volcanic boulders, which had completely blocked up the arch and filled the ravine, so that the river was running over the bridge instead of under it. Both road and bridge were covered with boulders, and, in order to lighten the carriage and get it across, we were forced to wade the stream, which was running with great velocity, but which, at that time, was not more than knee-deep. A small party of laborers, under the direction of an engineer or foreman from the Department of Roads and Bridges, was trying to repair damages ; but they all looked anxious and apprehensive, and a mounted officer of gendarmes, who had been stationed there to watch the progress of the work, begged us to tell the higher authorities that the post was a very dangerous one, and to recommend that the party be relieved from duty at the mouth of that gorge. After what I had seen of the Falaise from the summit of the Calebasse divide the previous afternoon, I was fully prepared to sympathize with the young offi-

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cer's feeling of apprehension, and we soon had evidence to show that it was well founded. Just after we passed Vivé a torrent of hot water rushed down the gorge into the Capot, throwing up clouds of white steam along its course for a distance of a mile and a half or two miles.

We reached Acier soon after noon, and learned, to our great surprise, that Professor Angelo Heilprin, of Philadelphia, and Mr. Leadbeater, a photographer from New York, had arrived there during our absence, and had started up the mountain that morning, by way of the Balais arête, with the intention of reaching, if possible, the main crater. The top of the volcano, when we got back to Acier, was completely enveloped in clouds; and as the afternoon wore away and the mountain-climbers did not return, we began to feel some anxiety with regard to their safety. They made their appearance, however, about five o'clock, and reported that they had succeeded in reaching the summit, but had been overtaken there by a severe thunder-storm, with sharp lightning and dense blinding clouds, which prevented

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them from finding their way beyond the eastern edge of what had been Lake Palmiste—a small pond that once occupied the bed of an ancient crater. There, at a height of about four thousand feet, they sat down among the volcanic boulders, in a pouring rain, and waited three-quarters of an hour for a change of weather; but as the storm continued, and as there seemed to be little prospect of locating or reaching the new crater that afternoon, they finally abandoned the attempt to find it, and came down the mountain in a tropical deluge which set the ashes sliding in every direction and threatened, at times, to sweep them off the narrow arête into the gorge of the Falaise.

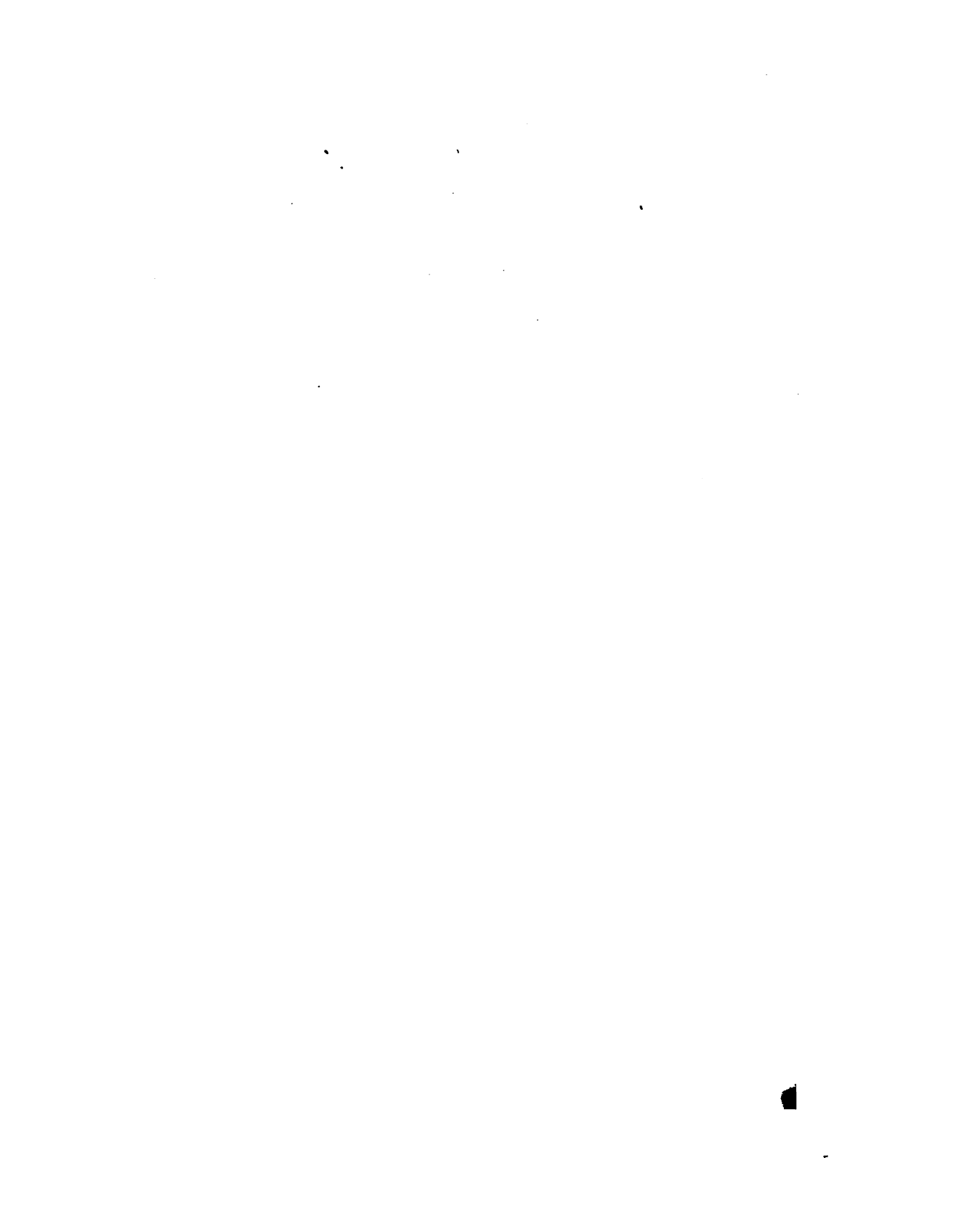
At a consultation which we held while sitting in rocking-chairs out on the lawn that evening, we decided that if the weather should prove favorable we would make another attempt to reach the summit crater on the following day.

The morning of June 1 dawned perfectly clear, and when we went out into the front yard at five o'clock and looked at the volcano, we could see nothing whatever to indi-

THE TRAGEDY OF PELÉE

cate dangerous activity. The upper slopes of the mountain were cloudless ; everything was quiet in the gorge of the Falaise ; and the column of vapor which was rising slowly from the main crater seemed to consist wholly of pure white steam. Mademoiselle Marie, who was never absent when her presence was needful, and never idle when she could do anything for our comfort, roused the servants at half-past four, attended to the preparation of an early breakfast and packed a generous basket of luncheon to be taken with us up the mountain. At six o'clock we drove in carriages to Vivé, mounted saddle-mules that had been provided by Mr. Chancel, and rode away across the Capot bridge in the direction of Morne Balais.

Although the arête that we intended to climb was in plain sight from the valley of the Capot, it was by no means easy of access. The lower slopes of Mont Pelée on the Vivé side were intersected by deep barrancas, cut in the mountain side by intermittent torrents, and were covered, moreover, by a dense growth of uncut sugar-cane. The





CROSSING THE LAC DES PALMISTES ON THE TOP OF MONT PELÉE, JUNE 1ST

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barrancas could be crossed only at certain points, and the wilderness of cane was intersected by such a maze of foot-paths that a stranger might easily get lost in it, as one of our party subsequently discovered. Our native porters, however, knew all the paths and barranca-crossings and guided us to the arête by the shortest practicable route. About three miles from Vivé, we passed through a half-deserted village belonging to the commune of Ajoupa Bouillon, and then turning southwestward, rode across a high, desolate pasture, deeply buried in ashes, to a solitary blasted tree near the foot of the arête. Leaving our mules at a broken-down fence just beyond the tree, we took a few bites of chocolate and a drink of water and began the long, wearisome climb to the crater.

The ascent, from an Alpine guide's point of view, would doubtless have been regarded as perfectly easy; but in the blazing sunshine of the tropics, a climb of half a mile over a slope covered with furrowed, half-compacted ashes which break under foot and slide backward at almost every step is by no means an easy task—even although the grade

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be moderate. Before I had ascended a thousand feet I was dripping with perspiration and panting for breath, and had to shout to the water-boy to bring me a drink.

While I rested and recovered my breath, I had an opportunity to look about me and enjoy one of the most beautiful views in Martinique. The whole eastern coast of the island was in sight, from the promontory of Basse Pointe to the long, irregular peninsula that juts out into the ocean at Trinité. On the south we could see the steeple of the Morne Rouge church, Mont Calvary with its colossal crucifix, and the forest-clad peaks of Carbet; while far away to the northward rose the misty outline of the island of Dominica, like a faint purple silhouette on the margin of an indigo-blue sea. The picturesque effect of the distant view was greatly enhanced by the utter desolation of the immediate foreground. At our left was the wild, chaotic gorge of the Falaise, in which there was not a sign of life nor a suggestion of color other than leaden gray; while beyond it we looked into the broad fertile valley of Champ Flore, where everything was vividly green, and

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where the scattered clumps of mango trees and cocoanut palms were linked together by silvery streams running through verdant fields of young sugar-cane to the Capot. Around and above us we could see only bare gray slopes, covered with ashes, cinders and volcanic stones; but far away to the eastward were the green buttresses of Morne Jacob, the red roofs of Grande Anse and Marigot, the costal fringe of snowy surf, and the deep-blue plain of the ocean, whose boundary line seemed to be half way up the sky.

When I stopped to rest, Mr. Varian, who seemed to be the strongest and most energetic climber in the party, was six or eight hundred feet above me, and Prof. Heilprin, with Mr. Jaccaci and three or four porters, was about as far below. In a few moments Heilprin joined me and said that Jaccaci was suffering from temporary dizziness. At a height of about 2,800 feet, where the arête narrowed to a rather sharp edge, with a profoundly deep gorge on either side, he had been attacked by mountain sickness with vertigo, and had been forced to stop. We

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sent one of the porters back to him with a bottle of Mr. Clerc's "cyclone" wine, and went on up the mountain—thinking that he would feel better in a few moments and follow us; but he did not recover from the dizziness and had to return. I think I should have been tempted to give it up and return myself, if Mr. Heilprin, who is an experienced mountaineer, had not encouraged me and shown me how to climb. There happened that day to be little or no breeze; the heat on the bare, desolate ash-slope was simply prostrating; and as a result of trying to climb too rapidly I felt as if I were going to have a sunstroke. Professor Heilprin, however, insisted that I would get up all right if I would only go slowly. "Take it easy! Take it easy, Mr. Kennan!" he shouted every five minutes. "We've got all day before us. Don't get overheated. Stop every ten steps and rest. One of the first things that my Alpine guides taught me was to climb slowly." I finally did climb slowly and began to feel better.

Clouds gathered about the mountain as we approached the summit, and when we

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struggled up the last steep ascent and reached the edge of the dry lake-bed at the head of the arête, we found ourselves enveloped in driving mist, through which we could see only a few square rods of stony, cindery, boulder-strewn ground, and now and then the vague outlines of a high black ridge two or three hundred feet away to the westward.

As our compasses were so disturbed by the magnetism of the mountain that we could not depend on them, I thought it would be prudent to mark the place where we crossed the rim of the old crater-bed, so that if we should get lost in the dense clouds on the summit, we might find again, with certainty, the top of the ridge up which we had come. Three or four diverging arêtes ran down from the lake-bed on the eastern side of the mountain; they all looked exactly alike; and if we should happen to be overtaken by one of the terrific thunderstorms that burst at intervals on the crest of Mont Pelée, we might become bewildered in the clouds and rain, start down the wrong arête, and get into serious difficulties in the dangerous gorge of the Falaise. The tor-

THE TRAGEDY OF PELÉE

rents of water that rush into the ravines and deeply eroded channels of the volcano during heavy storms loosen up the ashes and set them sliding in every direction ; and if a man should lose his bearings in the clouds and start down an arête leading into the precipitous gorge of the Falaise, he could not possibly retrace his steps against the down-rushing flood of mud and water, and would very likely come to grief. I therefore picked out a big, flat-topped boulder at the head of the Balais arête, and laid half a dozen stones across the top of it in a line with Vivé, so that they might serve as a guide in case of need.

As it was impossible to explore the mountain top in a mist that hid everything from sight at a distance of twenty feet, there was nothing to do but wait patiently for a change of weather. I was surprised to find that on the very summit of the volcano there were no ashes at all. The ground seemed to be made up wholly of cinders and sharp-edged rock-fragments which had evidently been thrown out of the main crater in recent eruptions. Some of the rock-

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masses were large, many of them had been completely calcined, and all showed the effects of intense heat ; but I saw none that had actually been fused, and of mud or lava there was not a trace.

In fifteen or twenty minutes the clouds blew away and the atmosphere cleared so that we could see the whole outline of the shallow oval basin that once held the water of Lake Palmiste. It was perfectly dry ; its bottom was covered with stones, cinders, and ragged masses of volcanic rock ; and from every square yard of it rose thin wisps of hot vapor. The whole top of the mountain oozed steam. Professor Heilprin got out his pocket thermometer and found that the temperature of the ground in a number of places and at various depths ranged from 124° to 162° Fahrenheit. Directly opposite the point where we stood, on the other side of the lake-bed, rose a black pinnacle of rock 150 or 200 feet in height, which we took to be Morne Lacroix. This was, and probably still is, the highest peak of the volcano ; but a part of it has been blown away, or has fallen into the new crater at its base, so that the

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remainder is merely a fragment of the original morne.

One hundred and fifty or two hundred yards away, near what seemed to be the southwestern end of the lake-bed, there was a gentle slope which rose twenty-five or thirty feet to a sharp edge; and just beyond this edge was the ascending vapor-column of the main crater. Picking our way carefully among the big boulders, we crossed the lake-bed diagonally and walked up the gentle slope to the sharp edge, at a point about seventy-five feet north of the ascending column of steam. I expected, of course, to look over that edge into the crater; but I thought that on the other side there would probably be a gradual downward slope into something like a huge circular bowl. I was tremendously startled, therefore, to find myself suddenly on the very brink of a frightful chasm fifty or seventy-five feet across and hundreds of feet in depth, out of which came a roar like that of a Titanic forge with the bellows at work, and a curious crackling sound which suggested the splitting of rocks in intense heat. The wall of the chasm under

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my feet was absolutely perpendicular—even if it did not overhang—and by bending forward a little I could see down a hundred and fifty or two hundred feet. Beyond that point clear vision was lost in a sort of bright, vapory shimmer, like the shimmer at the top of a white-hot blast-furnace. On the other side of the immense fissure was a huge chaotic mass of volcanic débris, piled together in the wildest confusion, and out of it, into the throat of the chasm, projected three or four long, angular, toothlike rocks, which had been so calcined as to be almost white. With a powerful glass I had seen these same white rocks from St. Pierre, and I knew, therefore, that if the ascending vapor-column south of us were removed we might look straight out through the chasm at the ruined city beyond it.

Steam and eddying clouds hid so much of the crater that it was impossible to form any idea of its size or shape; but my impression was that the chasm into which we looked was only one side of a more or less circular pit or bowl, and that the pile of rocks which seemed to form the western end of the fis-

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sure was a central cone of volcanic débris. The height of the lake-bed, as shown by Prof. Heilprin's aneroid, was 4,025 feet, and the edge of the crater was probably 25 or 30 feet higher. We were unable to determine with accuracy the trend of the crater-fissure, owing to the derangement of our compasses by the strong magnetic influence of the volcano; but it seemed to me that the part of the chasm we saw ran nearly north and south, curving to the westward at the northern end, where it disappeared in a cloud of steam.

We were all so overawed by the terrific grandeur of the deep, roaring chasm that for two or three minutes we stood on the brink of it, motionless and silent. Then Professor Heilprin shouted to me, "Oh, isn't it fine to see these great operations of Nature!"

"Yes," I replied, "but if you've seen all you want to of this particular operation, I would suggest that we get off this edge. It looks to me as if it overhung, and it might cave away and carry us all down into the crater—it's nothing but cinders and stones."

I had hardly finished making this prudent

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suggestion when a great swirl of gray clouds hid everything from sight, and we were hardly able to find our way back through the mist and steam to the big white boulder at the head of the arête where we had left our coats, luncheon, and water-bottles. We remained on the summit fifteen or twenty minutes longer, hoping that it would clear up enough to give us another view of the crater-chasm ; but while we were eating our luncheon the clouds grew denser and darker, and, fearing that we should be caught on the summit in a thunder-storm, we hastily started downward. Rain began to fall a few moments later, and we had hardly crossed the narrow, dangerous part of the arête when it was flooded by the worst storm that we experienced in Martinique. Water fell from the low-hanging clouds in sheets ; and when we reached the half-deserted village near the foot of the arête, Professor Heilprin sought shelter. As we were already drenched to the skin, Varian and I rode on ; but we were soon stopped by an impassable torrent in one of the deep barrancas. We then returned to the village and separated, Varian going

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in search of Professor Heilprin, while I took refuge in an empty shack by the roadside. Rain fell for an hour and a half in blinding sheets, with vivid lightning and heavy thunder, and muddy water rushed through the lower part of the village in such raging torrents that I more than half expected to be overwhelmed by a Basse Pointe flood. I could neither get down to Vivé nor back to the part of the village where Heilprin and Varian were. I tried once to rejoin them, but was stopped by a chocolate-colored cataract that would have carried away a house. Returning to my shack, I practiced calisthenics at intervals for an hour or more to counteract the chill of my wet clothing. By that time the storm had abated, and as soon as the flood-water ran off so that I could pass the cataract, I went in search of Heilprin and Varian. I found them sitting with half a dozen of our negro porters and guides in a wretched little eight-by-ten cabin near the highest part of the settlement. The native who owned the shack mixed for me a refreshing drink of lime-juice, sugar-syrup and rum, and we sat there discussing Mar-

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tinique meteorology and the volcano until the rain ceased and the water ran off so that we could get across the barrancas.

When we reached Vivé, about four o'clock, we found that our unfortunate comrade, Mr. Jaccaci, had only just come in. He had lost his way on the mountain, and had wandered about in the storm all the afternoon, trying to find a path downward that did not lead into a torrent or a flooded barranca. He was very tired; had had nothing to eat or drink since morning; and had been drenched to the skin for hours; but these physical hardships did not trouble him so much as the attack of mountain-sickness and vertigo which had prevented him from reaching the summit of the volcano. That, although a mere accident, was very trying and exasperating to a man of his adventurous disposition and intrepid spirit. We drove from Vivé to Acier in a carriage, and reached our base of operations and supplies about five o'clock in the afternoon.

The mistake that we made in this ascent was starting too late and from a point that was too remote. If we had slept in one of

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the deserted shacks of the village near the foot of the arête, and had begun the ascent from there at daybreak, we should have had a clear atmosphere on the summit for two or three hours, and should probably have been able to make something like an accurate survey of the main crater.

VIII
THE WESTERN SLOPE OF
MONT PELÉE

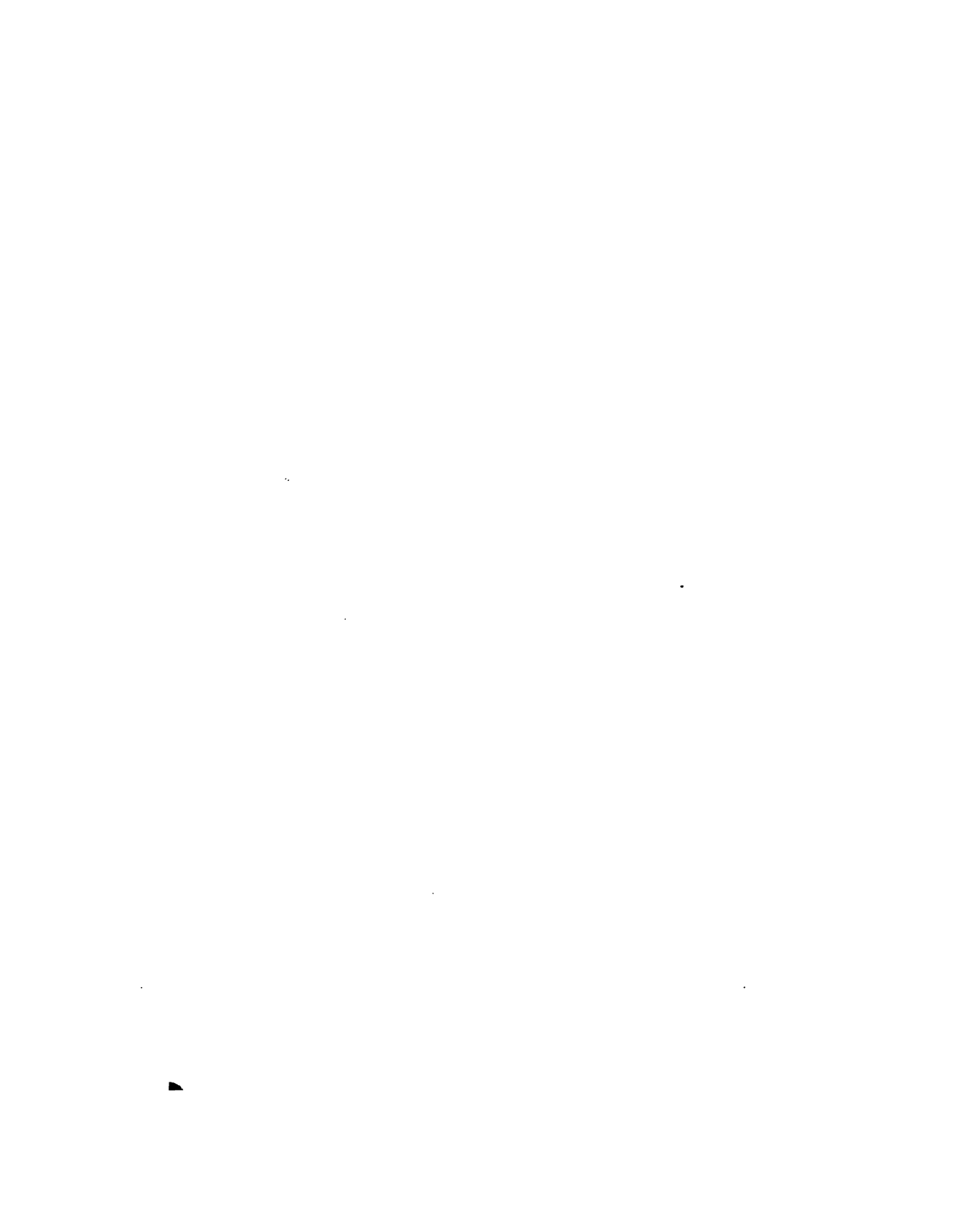
ON the 2d of June, Mr. Jaccaci, Mr. Varian, and I decided to return to Fort de France. We had made as thorough an examination of Mont Pelée as it was possible to make on the eastern side, and it seemed to us that the best thing to do next would be to charter a tug or vessel of some sort in Fort de France and cruise along the base of the volcano from Carbet to Grande Rivière, or Macouba, stopping at St. Pierre, Prêcheur, and other points of interest on our way back. Professor Heilprin and Mr. Leadbeater, who had not yet visited Morne Rouge, wanted to go there for a day, but they promised to rejoin us on Wednesday in Fort de France and go with us up the western coast.

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We left Acier about nine o'clock, and found the seacoast road full of fugitives, as usual; but they were not all bound in the same direction. Nearly half of them were apparently on their way back to their homes in Morne Rouge, Ajoupa Bouillon, and Macouba. For more than a month, after Mont Pelée began to be active in May, the whole population of Northern Martinique lived an anxious, restless, migratory life. Every time there was an eruption—or even an unusual boiling out of vapor from the main crater—hundreds of families living on the flanks of the volcano, or around its base, caught up hurriedly such household goods and utensils and such supplies of food as they could carry on their heads, and fled to a distance of five, ten, or fifteen miles, according to the intensity of their fear. Then, when the volcano quieted down, they gradually straggled back to their homes, only to be driven away again by a fresh outburst. Old women who could hardly hobble along with a cane, cripples, mothers with young babies in their arms, and children only five or six years of age walked three or four



LOOKING UP ONE OF THE UPPER GORGES OF THE FALAISE



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times back and forth, in the scorching tropical sunshine, over distances of from ten to twenty miles, frequently camping at night in the open air, or sleeping in crowded, improvised barracks at Grande Anse, Marigot, or St. Marie. For weeks, therefore, the road between Vivé and Trinité was full of tired, hungry fugitives, hurrying away from the volcano in a panic, or straggling back to their homes with reviving courage when the mountain ceased to threaten. At Grande Anse we found the streets so thronged with refugees that we could hardly make our way through the place, and there were crowds almost as large at Marigot and St. Marie.

We reached Trinité soon after noon, and expected to leave there for Fort de France at once ; but we failed to get a fresh relay of mules and were detained until half-past five. The team that we finally did get was either very tired or very much out of condition, and it became evident, before eight o'clock, that we should not be able to drive through to Fort de France that night. It was very dark ; the mules could not be flogged out of a slow walk ; and it seemed to be doubtful, at one

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time, whether we should get anywhere before morning. About half-past nine, however, we saw the twinkle of lights ahead, and twenty minutes later we entered the quiet village of St. Joseph. As there was no hotel in the place, we hardly knew where to seek shelter; but at the suggestion of two French gentlemen, who happened to be standing on the street and who volunteered to accompany us, we drove to the house of the curé. Father Jourdan had already gone to bed; but he got up at once, gave us a most cordial welcome, invited the two French gentlemen to come in, had supper prepared, and in half an hour we were all sitting around a small dining-table discussing Mont Pelée—the one absorbing topic of conversation in all Martinique.

After a comfortable and refreshing night's rest and a good breakfast, we started again for Fort de France; drove into the city about eleven o'clock, and received a hearty greeting from Consul Ayme, who was beginning to feel some anxiety with regard to our safety. We had been absent twelve days, and it was feared that something might have happened

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to us in the eruptions of May 26 and 28. Professor Heilprin and Mr. Leadbeater came in from Morne Rouge Tuesday evening, June 3, and early on the morning of the 5th, having chartered the tug Rubis at five hundred francs per day, we steamed out of the harbor and up the western coast of the island.

In approaching St. Pierre by water from Fort de France, the first noticeable signs of volcanic activity appear at the village of Carbet, which is situated about a mile and a half south of the city, on the margin of a gently rounded cape. The eastern edge of the volcanic hurricane of May 8 just touched this settlement, scorching the cocoanut trees and setting fire to a few houses at its northern end, but leaving intact the central and southern parts of the village, which were protected to some extent by high intervening bluffs. Trees standing on the hills behind Carbet and between it and St. Pierre show that the radiating, fan-shaped blast from the volcano extended eastward just far enough to sweep the city, and that a slight change in its direction would have made all the difference be-

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tween life and death to more than thirty thousand people. The advancing front of the hurricane, where it struck the ocean, probably had a width of about four miles; and St. Pierre was half or three-quarters of a mile inside of its eastern boundary line.

As we rounded the high cape of Carbet our field of view widened to the northward so as to include the whole gray, desolate slope of the volcano, from St. Pierre to Prêcheur, and from the dark-blue ocean to the broken trade-wind clouds that just drifted across the summit. At first sight and from that distance it looked like a sloping, fan-shaped plain of mud and ashes which had been cut into deep valleys, ravines, and gorges by raging torrents poured out of a wide, V-shaped cleft just under the main crater. Of the great forests that once clothed the upper part of the slope there remained not a trace. They had either been carried down by torrents and landslides or torn to pieces by volcanic hurricanes, and then buried under seventy-five or a hundred feet of ashes and mud. On the hills back of St. Pierre there were still a few branchless trees,

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but on the western slope of the volcano, between the Rivière des Pères and the Rivière Blanche, there was not so much as a splintered stub. It was simply a vast furrowed expanse of mud and ashes, varying in color from light gray to black, and relieved here and there by white jets or clouds of steam.

The sub-crater in the mud-choked valley of the Rivière Blanche seemed to be quiescent; but high up under the cloud-cap, in the tremendous gorge that cuts the upper slope of mountain almost into halves, I could see huge masses of volcanic rock tumbling out of the main crater and bounding in great leaps down the cañon, emitting dense clouds of steam that half hid them from sight. A long curving plume of vapor trailed away from the summit-crater on the leeward side of the mountain, and as we ran under it it sifted down upon us a shower of fine volcanic dust, which was very irritating to the eyes and throat, and which filled the air with a sort of smoky haze.

The area of complete devastation, on the western side of Mont Pelée, extends from the main crater to the sea, and from the Cape of

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La Mare, just south of Prêcheur, to the northern end of St. Pierre. Within the triangle that would be bounded by lines drawn through these points there is absolutely nothing except mud, ashes, steam, water, and stones. Every tree, every house, and every sign of vegetation has disappeared. Although for a distance of a mile or two outside of these limits crops have been ruined and trees have been denuded of their foliage by showers of ashes or muddy rain, the crops and the trees are still there, while inside of the triangle there is not a trace nor a vestige of life.

As we steamed northward, beyond Prêcheur, blasted trees and withered vegetation became less and less noticeable ; the mountain slopes changed in tint from ash-gray to brown and finally to dark green, and after we passed Pearl Rock, about three miles north of Prêcheur, I should not have known, from the color of the foliage or the general appearance of the landscape, that there was an active volcano on the island. We were nearer to the main crater than we had been at Vivé ; but the deposit of ashes on this part of the coast seemed to be much thinner than

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at the mouth of the Capot, and I could not see that it had injured vegetation at all. If I had not just come from the bare, steaming mud-slopes of the Rivière Blanche, I would not have believed that on the same volcano and in the same neighborhood there could be two areas so widely different in appearance. Between St. Pierre and Prêcheur there was hardly a suggestion of foliage or a trace of cultivation; while between Pearl Rock and Macouba everything looked as green and luxuriant as if the nearest volcano were in Iceland or Alaska.

The scenery of the whole northern coast of Martinique is extremely wild and picturesque. The massive arêtes or buttresses, which descend from the central mass of the volcano, break off on the sea in high, vine-draped precipices; the deep ravines between them are filled with breadfruit trees, wild bananas, and arborescent ferns; and here and there a slender stream leaps out into the sunshine from the dark forest on the brink of a cliff and falls two or three hundred feet into the ocean or upon a narrow strip of sandy beach.

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As we came out from under the shelter of the land off Grande Rivière we met a heavy swell raised by the fresh northeast trade-wind ; and as we did not care to attempt a landing in the surf that was rolling on the beach, we put about just beyond Macouba, ran back to Prêcheur, and went ashore there to see what damage had been done by the great flood that rushed down on the town through the valley of the Prêcheur River.

The first thing that attracted our attention, as we stepped upon the beach, was the great quantity of volcanic dust which covered the ground, incrustated with a thin gray plaster the walls of the abandoned houses, and lay, here and there, in deep, half-compacted drifts, along the empty streets. Much of this dust had, doubtless, been washed down from the mountain slopes by torrential rains ; but hundreds of tons of it must have fallen, like snow, from above. The steady trade-wind had been carrying the vapor from Mont Pelée directly over Prêcheur, day after day, for weeks ; and as that vapor was almost always charged with dust, even when the volcano was not in active eruption, there

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had been an incessant fall of ashes into the town and over the hillsides back of it. The result was a thicker deposit of this finely powdered volcanic material than could have been found anywhere else outside the area of total destruction. But it was not confined to roofs, walls and water-washed streets. It had found its way even into closed buildings, and lay, like a century's accumulation of ordinary dust, over tables, chairs, bedding and floors, so that the inside of a house was often as gray as the outside. This omnipresent grayness of walls, roofs, streets, bushes, trees and soil, taken in connection with the perfect stillness and the absence of all life, gave a sort of mysterious ghostliness to the whole settlement. In some dwellings that we examined, ashes brought down by flood-water had filled the lower stories to a depth of two or three feet ; and half-buried in the pasty volcanic mud stood cane-seated rocking-chairs, chintz-covered sofas, cupboards filled with dishes, and tables with kerosene lamps on them, just as they had been left by the panic-stricken occupants, when they fled from the deluge of water that

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seemed to be pouring down upon them from some great fissure in the mountain-side, thousands of feet above their heads.

Near the centre of the little town we found, in a rather large wooden building overlooking the sea, the hall of the "Société de Secours Mutuel: L'Union des Dames," which had been used, apparently, as a place of recreation, instruction, and assembly. There were blackboards on two sides of the room, checkers and dice were still lying on the tables, framed copies of the by-laws of the society and lists of active and honorary members had been tacked against the wall between cheap chromo-lithographs of the Emperor and Empress of Russia, and from the ceiling hung scraps of ribbon and colored Japanese lanterns that had been used, apparently, to decorate the hall for some recent festivity. Everything was gray with dust, which had blown in at the open windows, and the furniture was all in disorder, as if some one had rushed in hurriedly and ransacked the place in an attempt to save everything of value that could be carried away.

The greater part of the town seemed to

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have escaped serious injury ; but the lower stories of all the houses that stood near the river, and that were too solid to be carried away, had been filled with mud, wreckage, and débris, and the northern wall of a pretty stone church facing the ocean had fallen into an excavation twenty-five or thirty feet deep which one branch of the furious torrent had cut under it through the loose pumiceous soil. Half of the building was still standing, with a statue of the Virgin, or of some saint, on a pinnacle-like fragment of the front wall over the arched door.

Just north of the church was a steep-sided torrent-track forty-five or fifty feet in depth, and beyond that a stretch of sand and mud a hundred and fifty or two hundred yards across, covered with old volcanic boulders of enormous size which had been torn out of the mountain-side, and swept down to the sea in the bed of the once insignificant stream. I think I do not exaggerate when I say that there were hundreds of these boulders, packed together as closely as they could lie, and that they would weigh, on an average, fifteen to twenty tons each. Some of them were twenty

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feet long by ten or twelve feet in thickness, and must have contained at least twenty-five hundred cubic feet. When these colossal masses of rock came down that ravine in a flood that would have swept away and destroyed a battle-ship, the roar must have been like that of Niagara, and I do not wonder that the terrified inhabitants of Prêcheur fled.

Until the slopes of the volcano above the town shall have been carefully examined, it will be impossible to say with certainty where this deluge of water came from ; but I am of opinion that it was nothing more than a cloud-burst, due mainly to the sudden condensation and precipitation of immense quantities of volcanic steam. Professor Palmieri, of the University of Naples, says that great eruptions of Vesuvius were almost always followed by heavy storms of rain, which descended in muddy torrents, and caused as much damage as the lava itself. Sir Archibald Geikie, too, asserts that "the destructive torrents so frequently observed to form part of the phenomena of great volcanic explosions" are due, chiefly, to "the condensation of the vast

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clouds of steam which are discharged during the eruption." It does not seem necessary, therefore, to suppose that the floods which swept through Prêcheur and Basse Pointe came, in liquid form, from the interior of the volcano. They were true volcanic floods, but they had their origin outside of the crater.

Before we had finished our examination of Prêcheur a number of the former inhabitants, who had come from Fort de France with a small tug and a lighter, began to bring away in small boats the furniture from their abandoned houses, and it was evident that no one would try to live in the place until Mont Pelée should again become an "extinct" volcano.

A little before ten o'clock we returned to the Rubis and steamed down the coast as far as the mouth of the Rivière Blanche, where Professor Heilprin, accompanied by Mr. Jaccaci and Mr. Varian, went ashore in a small boat to examine the mud-slope and get the temperature, if possible, of one of the fumaroles. Mr. Leadbeater and I were not particularly interested in fumaroles and therefore remained on board. Mont Pelée at that time was perfectly quiet, and had not shown dangerous

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activity in two or three days. The summit-crater was smoking as usual, the front of the mud-glacier was steaming a little as it pushed down into the sea, and small jets or clouds of vapor were rising in half a dozen places from the hot, bare slope ; but the sub-crater in the valley of the Rivière Blanche was absolutely quiet, and the volcano, as a whole, seemed to be taking a rest. I watched the shore party as they landed from the small boat, and saw them walk three or four hundred yards up the river in the direction of a steaming fuma-rolé. Then I lost sight of them for a few moments as they went down, apparently, into the bed of the stream. Five minutes later my attention was attracted to a white cloud of pure steam which came racing down the upper gorge of the Rivière Blanche as if it were rising from a swiftly advancing torrent of boiling water. It looked dangerous, and I wanted to shout a warning to the party ashore ; but they were still out of sight and my voice would not carry half the distance. In a moment, however, they reappeared, and I saw that they had taken alarm and were running for the boat. They had hardly reached it

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when dense mud-smoke made its appearance in the high V-shaped gorge near the summit of the mountain and began to boil out of the upper valley of the Rivière Blanche. Two or three minutes later, before they had had time to get more than a hundred feet from the dangerous coast, there was a sudden and tremendous explosion from both craters, and an enormous mass of dark yellow vapor was projected upward in rolling, expanding convolutions, not only from the craters themselves, but apparently from the entire length of the fissure that united them. Then, from the lower crater, a huge cloud seemed to roll slowly down the slope in the direction of the boat, and the whole western face of the volcano burst into the most terrifying activity. A flood of boiling water, with a wave-front eight or ten feet high, rushed down the Rivière Blanche and precipitated itself into the sea with a great hissing and steaming; explosions in half a dozen different places sent big, fountain-like jets of white vapor to heights of two or three hundred feet; geysers of liquid mud leaped into the air through the clouds of steam that suddenly began to rise

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from the lower slopes; and the tremendous column of mud-smoke from the crater of the Rivière Blanche boiled up to a height of more than half a mile and then began to open out in huge, cauliflower-like heads.

The captain of the Rubis rang the bell for full speed ahead and ran directly out to sea, regardless of the men in the small boat, who were making frantic efforts to get away from the coast. I tapped him on the shoulder and said, "You must go back for the boat." He shook his head, and pointing at the really frightful-looking vapor-column over the lower crater said, "Bad! Ver' bad!"

"Yes," I said, "of course it's bad; but you've got to go back for that boat."

He kept on his course two or three minutes longer, and then, having had time to think a little, threw the wheel hard-a-starboard, came round in a big circle, and ran back toward the land. In five minutes more we had the shore party safely on board and were again running out to sea. Mr. Jaccaci wiped his perspiring face, gazed for a moment in silence at the volcano, which was then almost hidden in smoke, steam and falling





THE VILLAGE OF TROIS PONTS

WESTERN SLOPE OF MONT PELÉE

ashes, and finally said, without a thought of profanity, "Well, that does look like hell!"

"Yes," said Professor Heilprin; "I've seen a good many volcanic outbursts, but never anything so sudden and on such a scale as that."

Having gained a reasonably safe offing, we ordered the captain to stop the engine and let the tug drift. The great cloud from the lower crater was then floating away to the westward, gradually turning from a muddy yellow to a bluish black as it dropped a thick curtain of ashes over the ocean off Prêcheur. The whole lower slope of the volcano was still half hidden in steam, which rose partly from the fumaroles and partly from intermittent floods of hot water that came rushing down the valleys of the Rivières Sèche and Blanche. My impression was then that these floods were true eruptions from the lower crater; but it is equally possible that the water had its origin in rain-clouds which were hanging over the summit, and that it became heated in running down over the mass of hot mud and ashes which lay on the upper slopes. Its appearance in

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sudden torrents with a high wave-front was, perhaps, due to the formation and rupture of big dams. The sides of the gorges and ravines above the lower crater were very steep, and avalanches of ashes might slide off them and block up the channel of the stream below, so as to dam the water back and form a large pond. Sooner or later the increasing volume of water would burst the dam, and the whole mass would rush steaming down to the sea in a big flood. Then, too, the channels of these streams were deeply eroded in a mass of loose, incoherent volcanic ejectamenta, and dams may have been formed frequently by the undercutting of the stream and the caving away of the undermined banks. It seems to me more reasonable, on the whole, to explain the intermittent floods in this way than to suppose that the lower crater was throwing out hot water every fifteen minutes or half an hour.

We cruised or drifted off the mouth of the Rivière Blanche for several hours, and saw another eruption from the lower crater which threw a huge column of mud-smoke

WESTERN SLOPE OF MONT PELÉE

to a height of four or five thousand feet. It had a very menacing and terrifying appearance, but as the direction of the discharge was upward, and the rain of ashes that fell from it struck the ocean north of us, in the vicinity of Prêcheur, we felt less apprehension than at the time of the first eruption, when we were nearer the coast. If we could have foreseen, however, what was about to happen on that side of the volcano, we should have watched these outbursts with a feeling of much greater anxiety and dread.

At ten o'clock the next morning, when the French cable steamer Poyer Quartier was grappling for a broken cable about five miles off the mouth of the Rivière Blanche, there was an eruption of tremendous violence, which threw up a vapor-column that mushroomed to a width of fifty miles, and covered the whole island with the darkness of a total eclipse. At the same time a black hurricane-cloud, precisely like the one that destroyed St. Pierre, burst out of the mountain-side, swept over the place where we were drifting the previous afternoon, and went five miles to sea, covering the Poyer Quartier with

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ashes and small stones, and overwhelming four or five natives who happened to be passing in small boats on their way to Prêcheur. If we had happened to go up the western coast Friday instead of Thursday, our volcano investigations would probably have come to an end, because at ten o'clock our tug was lying close to the mouth of the Rivière Blanche, directly in the track of the tornado blast, and Heilprin, Jaccaci, and Varian were just going ashore.

IX
THE WRECKED CITY

FROM the mouth of the Rivière Blanche we ran down to St. Pierre and landed on the slope of the Place Bertin, nearly opposite the ruins of the old cathedral. The site of the city was a crescent-shaped strip of land, about a mile in length and four hundred yards in extreme width, lying between the curve of the ocean beach and the corresponding curve of a very steep ridge or hill. At the northern end of the crescent was the Rivière des Pères, backed by the immense green slope of Mont Pelée, and at the southern end, on a high rocky promontory, stood the Morne d'Orange Battery and the colossal white statue of the Virgin Mary. The ridge or hill which formed the back of

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the crescent, and which half inclosed the city on that side, was originally covered with grass, flowering shrubs, and festoons of hanging vines; and it must have made a beautiful green background for the mass of gabled, red-roofed houses which rose toward it in undulating slopes and irregular terraced lines from the curving margin of the dark-blue sea. The principal street of the city was the Rue Victor Hugo, which ran from one end of the crescent to the other, and which was crossed at intervals by shorter streets leading up from the ocean to the face of the high and partly terraced ridge. The buildings were generally two or three stories in height, and their walls were almost invariably made of rubble laid up in cement and faced with plaster or stucco. Although these walls were often three feet in thickness, they had comparatively little structural strength or resisting power, owing to the fact that they were composed of rounded stones, and were held together by a rather friable pouzzolane of volcanic tuff. They crumbled and fell, therefore, much more easily than if they had been made of rectangular blocks with a binding of good mortar or

T H E W R E C K E D C I T Y

Portland cement. Many of the dwelling-houses, moreover, had only one story, or two stories, of masonry, and were crowned with a frail superstructure of wood which might easily be torn off by a hurricane of wind, or set on fire by hot volcanic lapilli and dust. The streets were generally narrow, as well as crooked, and the sidewalks, which had a depth of only three or four feet, often climbed from one level, or one terrace, to another by means of mossy stone steps. The city was abundantly supplied with cool water from the encircling hills, and down many of the streets it ran constantly in little streams through the open gutters. There were century-old tamarinds, royal palms, mangoes, and silk-cotton trees in all the parks and private yards, and the masses of dark-green foliage, appearing here and there among the houses, heightened by contrast the pale yellow of the stuccoed walls and the bright red of the steep, tiled roofs. In short, St. Pierre, before the catastrophe of May 8, was a picturesque, brightly colored French city, set down in a West Indian environment between a range of vine-draped, palm-fringed hills and the margin of

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a tranquil, indigo-blue sea. After the catastrophe, it was a wrecked, ruined city of the dead, wrapped in a gray winding-sheet of volcanic ashes.

The first impression that it made upon me when I landed on the wreck-strewn beach of the Place Bertin was one of loneliness, stillness, grayness, and almost unimaginable desolation. There was no color, no structural form, no traceable plan, and no sign whatever of recent life. Turning one's back to the ocean and looking toward the bluff, across the shattered walls and shapeless piles of ash-incrusted stones, one might have imagined that he was looking at the ruins of a big pueblo in an Arizona desert, which had been destroyed by a frightful earthquake a hundred years before. It was almost impossible to realize, or even to believe, that, within a month, this had been a bright, gay, beautiful city of thirty thousand inhabitants. Here and there stood gaunt, fire-scorched trunks of trees, from which all branches had been torn away, and over the brown face of the steep ridge hung leafless remains of luxuriant vines; but, with these exceptions, there was nothing to indicate

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that anything had ever grown, blossomed, or borne fruit in this gray mass of century-old ruins.

The building that stood highest in the mouillage, or southern part of the city, was the old cathedral. The façade, with its three arched doors, was intact as far as the top of the first story, and the front wall of the north tower was standing to the top of the second story. The side walls had been thrown down, wholly or in part, and the interior was a shapeless mass of ruins, in which lay, half-buried, a large bell.

Walking up past the cathedral, we came to what had once been a beautiful little park, with a fountain in the center and a score of great palm, mango and silk-cotton trees to shade its greensward and walks. It had been turned into a flat expanse of dry volcanic mud, with the leafless and almost branchless trunks of the trees lying across it in parallel lines.

Away from the main streets there were only the foundations of walls and heaps of rounded stones to show where houses had been ; and one could pick one's way across

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the chaos of wreckage, in almost any direction, over piles of rubble, sheets of metallic roofing, steel braces or girders, masses of tree branches, iron bedsteads, smashed roofing-tiles, tangled telephone wire, burst-open safes and great mounds of ash-plastered building-stones, blocking up and almost obliterating the narrow streets. Even if I had been perfectly familiar with the city, I should have had great difficulty in finding my way about; and without such familiarity I could not orient myself at all. It was often impossible for me to determine whether I was in a street or in the midst of a ruined block of buildings. Of course, in a city that has been so completely wrecked there is little to describe. One can only say that it is a chaotic mass of rubble, plaster, roofing-tiles and shattered walls, with here and there the fire-scorched branches and trunk of a big tree.

With a view to ascertaining, if possible, the source and direction of the hurricane that caused this unparalleled destruction, I made a careful examination of standing walls and fallen trees. The highest walls were generally those that ran north and south and the

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walls that had been most completely destroyed were those running east and west. I called Professor Heilprin's attention in one place to five north-and-south walls of contiguous houses that were standing above the first story, edge-on to the volcano, while all the transverse east-and-west walls had been blown completely down.

Most of the fallen trees that I examined lay with their heads to the south. Some had swerved a little in falling; others had been thrown slightly out of a north-and-south line by the deflection of the blast from the curving hill; and a few had been washed away from their original positions by running water; but in open squares and streets near the beach, where they had not been affected by local influences, they lay directly away from the summit of the mountain. In various parts of the city I stood at the foliage ends of straight, fifty-foot palm trees and looked along their trunks. In every case a line drawn from the leaves to the roots, and prolonged northward, would strike the volcano near the head of the summit fissure. In other words, if these palm trunks were big guns that could be elevated

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a little and fired, the projectiles from them would go over or into the V-shaped notch, or amphitheater, just below the main crater. From that point, or near that point, must have come, therefore, the blast that prostrated them.

I was able to make some observations also that have a more or less direct bearing upon the temperature of the blast and its duration. In all parts of the city, and particularly at its southern end, there were quantities of wooden wreckage, in the shape of beams, planks, barrels, and fragments of roofing, that had not been burned, nor even singed. The trunks of green trees showed no traces of fire, unless they had happened to stand where they were scorched or ignited by the heat of burning buildings. Bunches of dry grass on the Morne d'Orange had been burned nearly to the ground; but the delicate twigs of living trees and bushes in the same locality were apparently uninjured. The blast was hot enough to destroy human life and to set fire to objects of a particularly inflammable nature; but it was not hot enough, or did not last long enough, to kill

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the roots of potted plants, nor to injure, noticeably, small green fruits hanging on the twigs of uprooted breadfruit trees. We saw fresh green shoots starting from a cactus-like plant that was growing out-of-doors in a twelve-inch pot ; Mr. Varian picked four or five trumpet-shaped blossoms of delicate pink from another potted plant, and I gathered green breadfruit that had not been burned or cooked, from a tree lying just south of the cemetery. Neither had the blast and the ashes been hot enough to destroy all forms of insect life. In the tornado valley of the Roxelane I had already seen a living tarantula in a house where everything else had perished ; and in more than a dozen places in St. Pierre we saw colonies of ants which had worked their way up from the underlying soil and were building little mounds of volcanic ashes around their holes.

With regard to the effect of the blast upon the bodies of human beings, I can give only second-hand information. Mr. Nicola Parravicino, Italian Consul at Barbadoes, who lost a daughter in St. Pierre and who was one of the first persons to enter the city after

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the catastrophe, says that the bodies of the dead were generally distorted and had the color of burned coffee. Most of them lay in the streets, where they had been subjected to the heat of burning buildings, and it was impossible to determine, by mere inspection, whether the condition in which they were found was due to the blast or to the subsequent conflagration. In some cases all clothing had been burned or torn off, while in others underclothing and corsets remained. Light outer garments were invariably gone. A very large number of bodies had burst at the abdomen;* all spongy, cellular tissues were greatly distended, and many skulls had parted at the sutures, without any indication of external injury. As decomposition, at that time, had hardly begun, Mr. Parravicino thinks that these effects were not due to that cause. They suggested rather a sudden removal of atmospheric pressure, brought

* The photograph of a man under the branches of a tamarind tree, which was taken by direction of Vicar-General Parel (*Century Magazine*, August, 1902, p. 615) and which has been reproduced by many American newspapers, shows this effect.

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about in some way by the blast. The fact that many bodies were found in this condition seems to me worthy of record, inasmuch as it rests upon the testimony of two unusually intelligent and observant men—Mr. Parravicino and Major Mirville, chief pharmacist of the Military Hospital at Fort de France. It is greatly to be regretted that the physicians and surgeons of Martinique did not make a series of careful post-mortem examinations immediately after the catastrophe. Many questions of scientific importance might thus have been settled that must now remain in doubt.

Evidences of the force of the volcanic blast that destroyed the city presented themselves at almost every step. Rubble walls three feet in thickness had been torn to pieces as if made of dominoes or kindergarten blocks; century-old trees had been uprooted or stripped of all their branches; six-inch guns, nine or ten feet in length, had been dismantled in the Morne d'Orange Battery; and the colossal statue of the Virgin Mary, which weighed at least two or three tons, had been blown off its pedestal

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and carried to a distance of forty or fifty feet. Such effects could hardly have been produced by a blast of lower velocity than a hundred miles an hour.

It is a remarkable fact that St. Pierre was struck by two volcanic hurricanes of equal severity—one occurring at 8.02 A.M. on the 8th of May, and the other about 5.15 A.M. on the 20th. As we reached Fort de France in the cruiser *Dixie* at 6 A.M. on the 21st, we missed the second blast by exactly twenty-four hours. If we had sailed from New York one day earlier, we should have been just off Mont Pelée when the second tornado-cloud rolled down on the ill-fated city.

Photographs taken between May 8 and May 20 show that the second blast must have had quite as much energy as the first. Before the 20th, the walls of hundreds of buildings in the central part of the city were standing two and three stories high; while after that date there were very few that stood, four-square, even as high as the top of the first story. The blast of May 8 wrecked the cathedral and threw down one of its twin towers; but all four walls of the other, as



REMAINS OF A FINE PRIVATE HOUSE NEAR THE BLUFF,
ST. PIERRE



ST. PIERRE LOOKING SOUTH

—

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high as the arches of the second tier of windows, stood until struck by the blast of the 20th. The front wall of the Military Hospital, with the town clock on the peak of its gable, withstood the first shock, but was so completely demolished by the second that I could not even discover its foundations.

Generally speaking, the eruption of the 20th threw down almost everything that still had the appearance of a building, and turned the already wrecked city into a mass of shapeless ruins. When we landed on the Place Bertin, Thursday, June 5, it was almost impossible to determine whether a particular heap of stones, plaster, and débris had been a store, a warehouse, a public building, or a private residence. I found, in one place, ten or fifteen charred bags of coarse salt; in another, an earthenware crock filled with long-stemmed clay tobacco pipes; in a third, a lot of padlocks, chains, carpenter's tools, and iron fish-spears; and in a fourth, the remains of a large tiled bath-basin; but there was nothing to indicate that these places were the sites, respectively, of a warehouse, a tobacconist's shop, a hardware store, and

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a private dwelling. The buildings themselves had been razed to their foundation stones.

Although the walls left standing, after the blast of the 8th, had doubtless been weakened, to some extent, by fire, they still had the appearance of great solidity, and could hardly have been overthrown by anything less destructive than a second hurricane. An earthquake might have demolished them, but no earth tremors were noticed at Morne Rouge or Fort de France, and no buildings were injured outside the area swept by the blast. It seems almost certain, therefore, that Mont Pelée fired two rounds at St. Pierre from its gigantic volcanic gun, without changing the aim; and that the second discharge completed the work of destruction begun by the first. Both eruptions were accompanied, or immediately followed, by torrential rains or cloud-bursts, and a deluge of water swept immense quantities of volcanic dust down the slopes of the mountain, in the shape of soft, pasty mud. This mud filled the valley of the Roxelane almost up to the floors of the bridges, buried many houses out of sight at

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the northern end of St. Pierre, and rushed into the sea so suddenly and in such enormous volumes as to produce a series of small tidal waves, which were observed and measured at Fort de France.

At the time when we visited St. Pierre all the bodies of the dead that could easily be recovered had been collected and burned; but thousands more lay buried in the ruins of the houses, or under heaps of wreckage and débris in the streets. They cannot be removed without extensive excavation, and they will doubtless lie there until only the bones are left. I doubt very much whether, in the lifetime of the present generation, any attempt will be made to rebuild the city. Wrecked towns are usually rebuilt by their surviving inhabitants; but St. Pierre has no surviving inhabitants—its whole population perished—and the impression made by the great disaster upon the people of the island was so deep, and the fear of the volcano is now so intense, that no men of the present generation are likely to make homes for themselves in that fire-scorched, ash-buried valley of death.

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We wandered over the ruins of the wrecked city for an hour and a half or two hours, and were then driven by a heavy rain to the shelter of the tug. As soon as the shower passed, we ran up again to the mouth of the Rivière Blanche, and watched the play of steam-jets and mud-geysers on that side of the mountain until the sun was low in the west. As there were no more extraordinary manifestations of volcanic energy, and as we were all tired, hungry and wet, we finally returned, just before dark, to Fort de France.

X
THE DESTRUCTION OF
ST. PIERRE

IN previous chapters I have tried to describe, as fully and accurately as possible, the appearance and behavior of Mont Pelée during the time that it was under my observation. It is my purpose now to give a brief account of the destruction of St. Pierre; to bring together and compare the statements of a dozen or more persons who witnessed the catastrophe; and to make an attempt, at least, to answer the questions, "What happened? In what way did it happen?" and "What were the proximate causes of the disaster?"

Mont Pelée has been active only once before within historic times. On the 5th of August, 1851, it rumbled or thundered for a

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few hours, and threw up a column of vapor which sprinkled ashes over its southwestern face from St. Pierre to Prêcheur; but the eruption was neither violent nor destructive, and soon subsided. A scientific commission, which made a careful examination of the mountain shortly afterward, found a few small craterlets and hot springs near the source of the Rivière Blanche, and a deep, narrow fissure—since known as the Fente, or Terre Fendue—which seemed to cut the top of the mountain into halves just west of Lake Palmiste; but the area of disturbance was small and the manifestations of activity were comparatively feeble. The Étang Sec, or Dry Lake, was found to be situated a short distance east of the craterlets and hot springs, at a height of 2,871 feet. Its basin, although ordinarily dry, then contained five times as much water as the basin of Lake Palmiste, on the summit, and both lakes were thought to be the bowls of ancient craters.

As the result of its examination, the commission reported that the volcanic disturbance had been confined to a small area in the upper valley of the Rivière Blanche; that there had

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been no perceptible change in the configuration of the mountain ; that the old craters, Étang Sec and Lake Palmiste, were full of water ; and that no danger was to be apprehended.

For half a century thereafter the volcano remained quiescent ; and Lake Palmiste, the basin of the ancient summit crater, became a favorite place of resort for excursionists and picnic parties from St. Pierre. The basin of the Étang Sec was not so often visited, on account of its comparative inaccessibility, but it could be seen from the heights above ; it had been overgrown by vegetation and it was generally dry.

The first signs of a renewal of volcanic activity were observed in April of the present year. M. Landes, professor of natural sciences in the St. Pierre Lycée, noticed steaming fumaroles in the upper valley of the Rivière Blanche as early as April 2 ; but there was nothing like an eruption until the 25th, when the volcano suddenly began to smoke and throw out ashes. A party of investigators set out at once from St. Pierre, and upon reaching the summit of Morne

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Lacroix—a pinnacle of the volcano which overlooks Lake Palmiste on one side and the Étang Sec on the other—discovered that the basin of the Dry Lake was filling with water. A few days later a larger party, consisting of Messrs. Boulin, Waddy, Decord, Bouteuil, Ange and Berte, ascended the mountain, by way, apparently, of the Rivière Blanche, and, after struggling for an hour through a dense, tangled forest, came out on the very brink of the Étang Sec basin. They found it to be a gigantic bowl, half a mile in diameter, with a lake at the bottom and a new cinder-cone on one side of it near the eastern wall. The trees around the bowl were covered with black volcanic dust, and there was a film of floating cinders on the surface of the water. No eruption from the cinder-cone took place while the party was watching it, but Messrs. Boulin and Berte believed it to be the source of the smoke and ashes seen on the 25th. Professor Landes, on the other hand, who climbed nearly to the Étang Sec a few days later, thought that the smoke rose from the Fente, or cleft, first noticed by the scientific commission of 1852.

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All observers agreed that the manifestations of activity were at the highest part of the volcano, between the Étang Sec and Lake Palmiste, and no one appears to have noticed anything that indicated a fissure in the gorge of the Rivière Blanche, or an opening in the place now occupied by the lower crater.

Vapor continued to rise from the volcano at intervals on the 28th and 29th of April, and on the 30th there were occasional detonations and two or three slight earth-tremors. On the 2d of May the inhabitants of Prêcheur were frightened by a heavy and continuous shower of ashes ; but the people of St. Pierre were so little alarmed that they planned and advertised a popular excursion to the new crater, to take place on Sunday, May 4. At 11.30 that night, however, there was a violent eruption, accompanied by dense smoke, lightning and terrifying detonations, and the country people fled, from all parts of the mountain, to Prêcheur, Morne Rouge and St. Pierre. Ashes fell over the whole northern half of the island from Grande Rivière to Fort de France, and continued to fall on the western slope of the volcano throughout Saturday, May 3.

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The people of St. Pierre then began to take alarm. The worshipers in the cathedral became panic-stricken; all the schools and many of the stores were closed; the proposed excursion to the crater was abandoned, and there was a general feeling of anxiety and apprehension.

The renewal of volcanic activity was accompanied by heavy rains on the summit of the mountain, which filled up the colossal bowl of the Étang Sec and sent floods of ash-laden, chocolate-colored water down the valleys of all the rivers between St. Pierre and Prêcheur. On the 5th of May, a little after noon, the lower bank of the Étang Sec was blown out by a volcanic explosion, or gave way under the increased pressure of water, and the whole lake suddenly rushed down the side of the mountain, from a height of nearly three thousand feet. In its fall it carried away trees, immense rocks, and thousands of tons of ashes, and by the time it reached the lower slopes it had become an avalanche of liquid ash-mud. Moving with the speed of an express train, it struck the big sugar-mill of Guérin & Son, at the mouth of the Rivière

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Blanche ; swept it completely out of existence, with young Guérin and thirty other persons ; and then plunged into the sea, overwhelming and sinking two yachts that were lying there at anchor, and raising a tidal wave which flooded the lower streets of St. Pierre and washed over all the beaches between Grande Rivière and Fort de France. This catastrophe greatly alarmed the people of St. Pierre, and they began to leave the city at the rate of three hundred per day. Thousands of fugitives, however, flocked in from Prêcheur, Ste. Philoméne, Morne Rouge and other villages on the flanks of the volcano, so that the population was increased rather than diminished.

On the morning of the 7th there was another eruption, accompanied by lightning, heavy explosions, and the appearance of incandescent matter at the edge of the summit-fissure. This greatly increased the feeling of apprehension in St. Pierre, and every boat leaving for Fort de France that day was crowded with fugitives. The local newspaper, however (*Les Colonies*), deprecated the panic ; declared that the alarm was not justified ; and

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said, on the very eve of the catastrophe: "Mont Pelée is no more to be feared by St. Pierre than Vesuvius is feared by Naples. We confess that we cannot understand this panic. Where could one be better off than at St. Pierre?"

Some observers, however, who were familiar with Vesuvius, took a different view. In the roadstead off the city lay at anchor, that very day, the Italian bark Orsolina, Captain Marino Leboffe, loading with sugar for Havre. Alarmed by the threatening appearance of the volcano, Captain Leboffe went to the shippers and said to them that he did not regard that roadstead as a safe place to be, and that he had decided to stop loading and sail for Havre.

"But," objected the shippers, "you can't go yet; you haven't got half your cargo aboard."

"That doesn't make any difference," replied the captain; "I'd rather sail with half a cargo than run such a risk as a man must run here."

The shippers assured him that Mont Pelée was not dangerous; that it had thrown out

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smoke and ashes in the same way once before, without doing any damage ; and that, in all probability, it wouldn't remain active a week. Even if it should, smoke and ashes couldn't hurt anybody.

“ I don't know anything about Mont Pelée,” said Captain Leboffe, “ but if Vesuvius were looking as your volcano looks this morning, I'd get out of Naples ; and I'm going to get out of here.”

The shippers then became angry and told him that if he sailed without permission and with only half a cargo, he would get no clearance papers, and would be arrested as soon as he reached Havre.

“ All right !” replied the imperturbable captain. “ I'll take my chance of arrest, but I won't take any chances on that volcano. I'm going to get my anchor up and make sail just as soon as I get aboard.” He bade them good-by and left them. The shippers then sent two customs officers to the bark, with instructions to stay on board and prevent her from leaving. The captain said to these officers: “ Gentlemen, I'm going to sail from this port in less than an hour. If you want

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to go ashore, now is your time to do it. If you stay with me, I assure you I shall take you to France.”

When the sails were loosed, and the crew began to heave up the anchor, the customs officers hailed a passing boat and went ashore, threatening the captain with all the penalties of the law.

Twenty-four hours later the shippers and the customs officers lay dead in the ruins of St. Pierre, and the bark Orsolina was far at sea, on her way to France. *

When the morning of May 8 dawned, bright and sunshiny, there was nothing in the appearance of the volcano to excite apprehension, except the immense column of vapor rising from the main crater. This was going to an unusual height, but it was not particularly dark in color, and a gentle wind from the east carried most of the ashes from it in

* The details of this incident were given to me by Mr. Nicola Emilio Parravicino, Italian Consul at Barbadoes, who lost a daughter at St. Pierre and spent a week or more searching the ruins after the destruction of the city. The owners of the Orsolina were the Brothers Pollio, of Meta, near Naples. They owned also the Italian bark North American, which was lost in the catastrophe.

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the direction of Prêcheur, so that the atmosphere south of the mountain was comparatively clear. At seven o'clock that morning there were eighteen vessels at anchor in the roadstead, including the British steamer Roddam; the repair steamer Grappler, of the West India and Panama Cable Company; the steamer Roraima, of the Quebec Line, which had just arrived from Dominica; the French ship Tamaya from Nantes; and the Italian barks Theresa Lovigo, Franchesa Sa Cro Cuore, and North American. The repair steamer Pouyer Quartier, of the French Cable Company, had just gone out to grapple for a broken cable, and was about eight miles off the coast, nearly opposite the mouth of Rivière Blanche.

A little before eight o'clock there were three or four big-gun reports, like those that startled us at Vivé on the night of May 26, and at two minutes past eight, by the time of the French Cable Company, the volcano suddenly exploded, with a great roar, in two different directions. One discharge, of intensely black vapor pierced with lightning-flashes, went directly upward from the main

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crater, while the other shot out laterally, apparently from a new fissure in the side of the mountain, and swept the whole southwestern slope from St. Pierre to the mouth of the Rivière La Mare. Both discharges consisted mainly of superheated steam carrying immense quantities of intensely hot dust, and both probably had an initial velocity of five or six hundred feet per second.† If the discharge that went upward from the main crater had been directed downward, along the slope of the volcano, and the discharge that went downward from the fissure had been sent upward, through the main crater, the results would probably have been very much the same.

As seen from Morne Rouge, from the Grande Réduit, from Mont Parnasse, from the vessels in the roadstead, and from the bridge of the Pouyer Quartier, eight miles

† Mr. Robert Mallet, the eminent English authority on earthquakes and volcanoes, gives 600 feet per second as the initial velocity of a column of dust-charged vapor projected to a height of 4,225 feet from the crater of Vesuvius in the eruption of 1872. (Introduction to "The Eruption of Vesuvius of 1872," by Professor Luigi Palmieri, p. 91. London, 1873.)



DÉBRIS IN LOWER STORY OF A HOUSE IN ST. PIERRE



ST. PIERRE LOOKING TOWARD THE OCEAN FROM NEAR THE
CEMETERY



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off the coast, the lateral discharge had the appearance of a black cloud, which swept down the mountain side with tremendous rapidity, like a cloud of black-powder smoke from the muzzle of a colossal gun. There may have been lightning-flashes in this discharge, as there were in the discharge that went upward; but the most trustworthy evidence that I have been able to get all tends to show that it did not contain flame at any time. Its descent was watched by Father Mary from Morne Rouge; by Messrs. Lassère and Simonut from the Grande Réduit; by Mr. Guirouard from the bishop's garden, just back of the Grande Réduit; by Mr. Fernand Clerc from Mont Parnasse, a mile east of St. Pierre; by Engineer Charles C. Evans from the deck of the Roraima; and by Mr. J. Montera from the French cable steamer, eight miles off the coast. None of these observers saw any flame in the cloud, or anything like an explosion of inflammable gas. Mr. Montera thought that when the discharge burst out of the mountain it was irradiated by a faint glow, as if the dust that it contained were incandescent. A dull, reddish

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color, which might have been a glow, was also noticed by Mr. Guirouard from the Grande Réduit and by Francesco d'Angelo from the deck of the Roraima ; but even this was not a flame-like appearance. Father Mary, at Morne Rouge, saw in the cloud what he called "fuses," or rocket-like bursts of gray smoke ; but they did not produce flame, and might have been caused by uprushes of mud and steam from the slope over which the discharge was moving. The upper surface of the cloud, from his point of view—1,400 feet above the sea—was level, like the surface of a great plain, and it looked, he said, "as if all Martinique were sliding into the sea."

When this blast of superheated steam and hot dust struck St. Pierre, with a velocity of not less than a hundred miles an hour, it produced all the effects that a West Indian hurricane would produce if the moving air had a temperature of, say, 250° Fahrenheit, and were sweeping along with it great quantities of fine sand and small stones which were even hotter than the blast that carried them. All the trees in the track of the discharge were

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blown down or stripped of their branches ; most of the houses were unroofed, partly demolished, and set on fire by the hot dust ; and all of the vessels in the roadstead, except two, were capsized and totally wrecked. The British steamer Roddam, set free by the parting of her anchor-chain, succeeded in making her escape, and reached the island of St. Lucia with twelve of her officers and men dead, and ten others so severely burned that they had to be taken to a hospital. The masts, funnel, bridge, and boats of the Roraima were carried away by the tremendous force of the blast ; her decks were swept by a storm of stones, pumice, and hot ashes, and she took fire fore and aft. Only two of her passengers — little Margaret Stokes and her nurse — escaped alive, and out of her crew of forty-seven men, twenty-eight died from burns and shock.

The whole population of St. Pierre perished, with the exception of a woman in a cellar who died shortly after being taken out, and a negro prisoner in the dungeon of the city jail. Thousands were killed by stones and falling walls, and thousands more by the

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intense heat of the blast, and the still greater heat of the dust with which it was charged. From the fact that the hot hurricane did not instantly kill all of the sailors exposed to it on the Roddam and Roraima, it is fair to presume that it did not instantly kill all of the people exposed to it in St. Pierre ; but as the city took fire from end to end, and soon became a roaring furnace of flame, the badly burned survivors of the blast, who had no place of refuge, must finally have been roasted to death in the streets. The heat of the flaming city was so great that the steamer *Marin*, from Fort de France, which reached the scene of the disaster about 11:30 A. M., could not approach the shore.

The discharge of the hot hurricane-cloud of steam and ashes from the lateral fissure of the volcano was followed almost immediately by total darkness, due partly to the dust carried by the blast itself, and partly to the mushrooming out overhead of the vapor-column thrown up simultaneously from the main crater. It was not ordinary darkness, like that of a cloudy, moonless night, but the complete obscurity of a windowless cellar or

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a deep cave. Mr. Clerc, on Mont Parnasse, could not see the children that were within reach of his arms ; Engineer Evans was not able to see his companion Morris at a distance of only two feet in the engine-room of the Roraima ; and Mr. Simonut, in a house on the Grande Réduit, asked his companion, Lassère, to strike a match so that he could see to cut the loose, hanging strips of burned skin from his hands. With the darkness came a light shower of small stones and pumice from the mushrooming cloud overhead, and this was immediately followed by a heavy rain which was so densely charged with ashes that it covered everything with a sticky plaster, and felt like a downpour of liquid mud.

It would be impossible to imagine anything more frightful and appalling than the environment of the surviving sailors on the Roraima when that untimely volcanic night settled down over the roadstead of St. Pierre. The impenetrable gloom ; the falling stones and pumice ; the wrecked steamer— covered with ashes and blazing fore and aft ; the flames of the burning city, seen dimly through

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a rain of liquid mud ; the thundering of the invisible volcano ; the cries and groans of the dying ; and the mysterious suddenness and horror of the whole catastrophe, must have shaken the nerves, and almost the reason, of the strongest and bravest men.

The total darkness lasted about half an hour. Before nine o'clock it began to clear up, and the sun came out, like a red ball, in an atmosphere of smoky haze. The volcano was then hidden from sight in a mantle of dark vapor ; the sky to the northward was black with falling ashes ; St. Pierre was a mass of flames, from the Morne d'Orange to the Rivière des Pères, and thirty thousand people lay dead in its burning ruins. The survivors of the unprecedented disaster were twenty or thirty officers and sailors on the steamers Roddam and Roraima ; half as many more floating on pieces of wreckage in the water ; a few writhing in the agony of their burns at the northern end of Carbet ; two French gentlemen in a wrecked carriage on the Grande Réduit ; one woman in the cellar of a St. Pierre house ; and one negro prisoner in the dungeon of the jail. Every

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other person in the track of the volcanic discharge was either dead or dying.

The clearest and most intelligible accounts of the disaster, as it appeared to observers on the wrecked vessels in the roadstead, are those given by Chief Officer Scott, Second Engineer Evans and Francesco d' Angelo, of the Quebec Line steamship Roraima. Mr. Evans was on deck when the hurricane-cloud burst out of the mountain, and he watched its descent until it struck the northern suburb of St. Pierre, beyond the Roxelane. As the first houses in that quarter of the city burst into flames, he rushed below, with his associate Morris, and took refuge in the engine-room. The blast swept over the steamer with a great roar, carrying away bridge, masts, smoke-stack and boats; smashing the engine-room skylights; and careening the ship until water came in-board over the lee rail. There was no flame in the hurricane-cloud, but it was so intensely hot that it burned or scalded flesh, even under the protection of clothing, and made breathing, for a moment, almost impossible. When Evans grouped his way on deck, in the darkness that followed the blast, the steamer was

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on fire in five places. Captain Muggah, who was terribly burned, jumped or fell overboard in the confusion that followed the disaster, and the command then devolved upon Chief Officer Scott, who had taken refuge in the steerage and had escaped serious injury. Under his direction, half a dozen of the crew, who were badly burned but not completely disabled, began a desperate fight with the fire in the steerage deck-house, forward, where the hot volcanic dust had ignited a pile of mattresses, directly over two or three thousand cases of kerosene. Water was hauled up in buckets and thrown into the deck-house through the door until the flames had been subdued a little, and then the mattresses were dragged out and thrown overboard. After an hour or two of hard work, the most dangerous fires were gotten under control; although combustible matter was still burning or smouldering in various parts of the ship.

From the account of the disaster given by Chief Officer Scott,* it is clear that the Roraima was set on fire by the ignition of

* *Frank Leslie's Popular Monthly*, July, 1902. p. 233.

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mattresses, cushions and other light inflammable articles in the deck-houses, staterooms and saloon. A large pile of dry spruce lumber, which lay near hatch No. 1 on the forward deck, did not take fire when the volcanic discharge struck it, nor did wood-work, generally, burst into flame. It is evident, therefore, that on the Roddam and Roraima, as in St. Pierre, the dust was hot enough to ignite textile fabrics and objects of a particularly inflammable nature, but was not hot enough to burn solid wood, unless it accumulated on the surface of such wood in quantity and lay there for a considerable time.

After the fires were under control, Chief Officer Scott, Benson, the ship's carpenter, and two or three other men whose hands were not so badly burned as to be useless, built a raft of lumber and cargo skids and equipped it with food, water, lanterns and a compass, so that they might have some means of escape in case they should be driven from the deck by another outburst of flame from the steerage or the saloon. They did not find it necessary, however, to make use of this raft, as the French cruiser Suchet came to

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their rescue between two and three o'clock in the afternoon. Twenty-eight survivors were taken from the wrecked steamer, but twenty of them were so burned that they died, either on the Suchet or in hospital at Fort de France.

The story told by Francesco d'Angelo, an intelligent sailor of the Roraima, differs in some respects from the account given by Messrs. Scott and Evans, but presents the disaster from another point of view and adds a number of interesting details. Just before the hurricane cloud struck the ship, d'Angelo, with two Italian sailors named Suzino and Avello, rushed pell-mell into the fore-castle and fell at full length on the floor. Half a dozen other men, who were running a few feet behind them, tumbled over their bodies, just in time to screen them partially from the force and heat of the blast. All the men at the top of the heap perished; but the three Italian sailors at the bottom were so covered up and protected that they escaped without mortal injury. Crawling out from under the bodies of their writhing comrades, they returned to the deck; saw that the

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steamer was on fire forward ; and, fearing an explosion of the kerosene in the fore-hold, jumped into the sea. The water was covered with fragments of wreckage blown from the decks of other vessels, and, seizing the first floating object that came to hand, they drifted away in the darkness toward the point of Carbet.

When it grew light again, they saw floating near them an overturned deck-house from the bark North American. On this deck-house were three Italian sailors, who had been blown overboard in it, but had not been burned or injured in any way. Leaving the spar that had hitherto supported them, d'Angelo, Suzino and Avello swam to the deck-house, and were helped to climb up on it by their unhurt fellow-countrymen from the bark. For the next three or four hours they drifted around in the roadstead, carried hither and thither by winds and currents, but not getting far away from the burning city. At some time in the course of this drift—d'Angelo thinks it was after noon—they came across Captain Muggah, still alive and clinging to a piece of wreckage. He was

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nearly naked ; his face was burned almost beyond recognition ; and he seemed to be totally blind ; but he was conscious, and asked for water and help. They had no water to give him, but they took him on the deck-house, and there, soon afterward, he died.*

In the course of the day d'Angelo and his companions picked up a number of floating or swimming survivors of the disaster, including a Spaniard and two negroes ; but they were all so terribly burned that they died in a few hours. About the middle of the afternoon the deck-house drifted in-shore near the mouillage, or southern end of the city ; and as the fires in that quarter had nearly died out, d'Angelo and one of the sailors from the North American swam ashore to get a boat which they could see lying on the Place Bertin. The boat proved to be shattered and unseaworthy ; but they found fresh water running from one of the

* The account of Captain Muggah's death given by Chief Officer Scott differs in some respects from this, but there seems to be no doubt that he died on a raft, or a piece of wreckage, some hours after he leaped or fell overboard.

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street pipes and had a refreshing drink. On the beach they were joined by Third Officer Thompson and a negro laborer from the Roraima, and the whole party went back on pieces of wreckage to the deck-house, where, late in the afternoon, they were found and rescued by a boat from the Suchet. D'Angelo, Suzino and Avello lay nearly a month in the Military Hospital at Fort de France, recovering from their burns, and then came to New York with us on the Quebec liner Fontabelle.

It is a noteworthy fact that the nine men who escaped death on the Roraima were all more or less perfectly sheltered from the dust-charged blast. Four are said to have been under cover in apartments with closed doors; two were in the engine-room below the water line; and three were protected by the bodies of other men who lay in a heap over them on the floor of the forecastle. All who stood unsheltered on the deck, and all who were in rooms with open doors or windows, died from shock, from burns, or from inhalation of hot dust and steam.

Generally speaking, the volcanic discharge

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killed or fatally burned every person who was fully exposed to it, both on shore and on the vessels in the roadstead. The only exceptions of which I am aware are Messrs. Simonut and Lassère, who were just in the edge of the blast on the Grande Réduit, and possibly a few officers and sailors of the British steamer Roddam. I have been unable to ascertain how many of the crew of that vessel had shelter nor how many finally recovered from their injuries. In the city of St. Pierre perished the governor of the colony and his wife ; Colonel Gerbault, Chief of Artillery, and his wife ; the British and American consuls and their families ; twenty-four priests ; seventy-one women belonging to Roman Catholic sisterhoods ; all the professors of the Lycée except five ; all the members of the scientific volcano commission except one ;* and the flower of Martinique's French population.

According to the best estimate that the acting Governor of Martinique could make,

* Major Mirville, chief pharmacist of the Military Hospital at Fort de France, had been appointed a member of this commission, but was accidentally prevented from going to St. Pierre with the other members on the 7th of May.

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there were between 30,000 and 31,000 people in the area swept by the hot volcanic blast. Probably not more than thirty of them escaped death, and only four, so far as I could ascertain, were uninjured. In comparison with such a disaster as this, the destruction of Pompeii seems an event of little importance. Never before, I think, within historic times, were thirty thousand people killed, in less than three minutes, by the direct action of a volcano. What were the proximate causes of the unprecedented catastrophe? Were the destructive agencies involved therein new? Or did Mont Pelée act merely as other volcanoes had acted, and exhibit forces that had been observed in operation before and that had produced the same results in other cases?

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IT will probably be impossible to explain satisfactorily the destruction of St. Pierre, until a careful and thorough examination shall have been made of the crater and southwestern slope of the volcano, from which the destroying blast came. It was impossible for us to make such examination, for the reason that the crater was too active and the slope too hot. We availed ourselves of every opportunity to study the mountain that time and chance gave us, but our observations were necessarily limited, and conclusions based upon them must, therefore, be tentative and, in part, conjectural.

The first question that presents itself is, "What was the source of the volcanic dis-



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charge that swept over the city ; did it come from the lower crater in the valley of the Rivière Blanche, or from the main crater on the summit ? ” With regard to this question there are differences of opinion.

When we went up the western coast of the island in the tug Rubis on the 5th of June, we saw, about 10 A. M., a very energetic eruption from the Rivière Blanche crater. We could not determine, with perfect accuracy, the location of the vent from which the tremendous outburst of mud-smoke came ; but it seemed to be situated low down on the slope, and not more than a mile and three-quarters from the coast line. The latest French chart of Martinique shows, on the right bank of the Rivière Blanche, nearly due east from Prêcheur, an unnamed peak, or elevated ridge, with a height of 2,296 feet. At the beginning of the eruption we could see this peak distinctly ; and the uprush of mud-colored vapor showed greatest explosive energy at a point seven or eight hundred feet below and about fifteen hundred feet south-east of its summit. If the sub-crater be situated there, it must lie nearly five hundred

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feet below the main crater, and a mile and three-quarters away from it, on a line running about S. 30° W. This is very nearly the position given to it by Mr. Robert T. Hill, of the United States Geological Survey ; but it does not correspond at all with the position of the Étang Sec, or Dry Lake, where destructive activity on this side of the mountain began. According to the French scientific commission of 1852, the Étang Sec was situated at the very head of the Rivière Blanche, perhaps a mile from the present main crater and 2,871 feet above the sea. The uprush of mud-vapor that we saw came from a point about a mile and three-quarters from the main crater, and not more, I think, than 1,500 or 1,600 feet above the sea.

The exact location of this sub-crater would not, perhaps, be a matter of particular importance if it had not been generally assumed that the blast which destroyed St. Pierre came from this particular vent. I do not think, myself, that such was the case ; but it is necessary to have some idea of the topography of the mountain on its southern and western sides in order to understand what

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happened—or what seems to have happened—on the 8th of May.

Between the point where we saw the most energetic uprush of mud-smoke and the immense V-shaped notch, or amphitheatre, just under the main crater, there is a deeply eroded ravine, or gorge, which, as seen from the St. Pierre side, cuts the upper slope of the mountain into halves, approximately along the line of the Rivière Blanche. In the bottom of this gorge there appears to be either a fissure or a series of vents, from which mud-smoke—that is, dust-charged vapor from the interior of the volcano—rises in a continuous cloud all the way from the main crater to the sub-crater, twenty-five hundred feet lower down. Standing in front of the Morne Rouge church, on the morning of May 31, I saw a brief eruption which sent up an unbroken wall of dark yellow mud-smoke along this gorge for a distance of considerably more than a mile. The line of the smoke-wall was exactly at right angles to my line of vision, and as the morning was clear, and there were no intervening steam-jets, I could see it perfectly, and make sure that it

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was continuous. I had observed the same phenomenon from Acier during the great eruption of May 28, and noted it, at that time, as "an apparent widening of the crater in the direction of St. Pierre." What seemed, from that point of view, to be a sudden and extraordinary increase in the width of the ascending vapor-column was nothing more than its extension down the fissure, or series of vents, in the gorge of the Rivière Blanche. I think it probable, therefore, that from the great steep-sided amphitheatre under the main crater there extends downward, in a direction somewhat west of St. Pierre, an opening, or openings, from the interior of the volcano, in the shape of a fissure, or a series of vents, from which dust-charged vapor rises during an eruption.

The direction of this line of cleavage from the V-shaped opening under the main crater is S. 30° W., while the direction of St. Pierre from the same point is S. 10° W. The outside lines of the explosive blast of May 8 were, proximately, due south and S. 50° W. radially away from the summit crater. The distance of St. Pierre from that crater is a

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trifle more than four miles and a quarter, and from the sub-crater in the valley of the Rivière Blanche about two miles and three-fifths. The existence of a fissure, or a series of vents, in the trough between these two craters is not at all certain; but I can think of no other explanation of the long wall of mud-smoke that I saw rising from the line of the trough when I was in Morne Rouge.

Every eruption of mud-smoke from the lower crater seemed to be accompanied by an increased discharge of the same kind of vapor from the main crater, and immediately afterward there were uprushes of white steam, intermittent floods of hot water, and geysers of liquid mud in the beds of all the streams and from the surface of the slope. I do not think, however, that there were any openings from the interior of the volcano on that side except the Rivière Blanche crater, and the fissure or line of vents running from it to the crater on the summit. The vapor-jets and mud-geysers were probably nothing more than simple explosions, due to the sudden escape of steam that had formed in the hot

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they would lie across the arête, with their roots toward the Rivière Blanche and their heads toward Morne Rouge. Finally, in an explosion of any kind, a blast of extraordinary violence on one side indicates the existence of a wall or unyielding barrier behind the blast on the other side. The tendency of exploding gases is to expand equally and evenly in all directions; but if escape on one side be cut off by an unyielding wall, the lateral force of the explosion on the other side will be greatly increased.*

There is no such wall north of the lower crater, but there may be north of the summit fissure, at or above the Étang Sec. All in-

* The extraordinary violence of the lateral blast caused by the explosion of the Toulon powder-magazine, in March, 1899, was due, apparently, to the fact that the massive wall of the magazine on one side did not yield until after the wall on the other side had given way; so that, as Colonel Bucknill says, there was "practically formed a sort of cannon or mortar." The unyielding back wall greatly increased the lateral violence of the explosion in front of it, and the blast thus formed threw stones to a distance of two miles and a half and blew in doors and windows at a distance of four miles and a third, the discharge taking the horizontal line of least resistance and leaving objects to the right and left of that line uninjured.—*Engineering*, London, May 26, 1899.

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dications, therefore, furnished by the topography of the mountain, the position of fallen trees, and the boundaries of the devastated area, go to show that the destructive blast did not come from the crater in the valley of the Rivière Blanche, but had its origin at or near the summit of the volcano.

The next question raised by the catastrophe relates to the nature of the volcanic discharge. Was it composed mainly of superheated steam densely charged with hot dust, or did it consist largely of inflammable gas which took fire in the air at a distance from its place of origin? Two, at least, of the American geologists who went to Martinique to investigate the eruption support the gas-explosion theory, for the reason, apparently, that it accounts for the flames said to have been seen in the hurricane-cloud. But, as a matter of fact, did the cloud burst into flame? I think not.

The frequent reference to "flame," "lava," "burning gas," and "a rain of fire," in the early accounts of the disaster, were due, I think, partly to inaccurate observation, partly to the appearance of lightning-flashes in the

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lateral discharge,* and partly to excitement and a confused blending of effect with cause. It is perfectly natural to associate intense heat with visible flame; and when a cloud burns flesh and sets fire to every inflammable object that it touches, the average observer concludes that it must contain the flame that it communicates; and if he has happened to see in it a lightning-flash or two, he declares, without hesitation, either that it came out of the volcano in the shape of a "whirlwind of fire," or that it suddenly "burst into flame" in mid-air. Some of the sailors of the Roraima insisted that they were burned by "tongues of flame" as they lay on the floor in the forecastle; but when they were closely questioned and their attention was called to the fact that their clothing was not scorched, they had to admit that they did not actually see the "tongues of flame,"

* If the cloud was lighted up at intervals by electric stars, such as those that we saw in the volcanic mantle over Vivé, miles away from the crater, on the night of May 26, such stars might easily be taken for flamelike explosions of gas; but the most trustworthy observers say that they saw no electric discharges of that kind.

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but thought that there must have been flames to set the ship on fire. Volcanic dust, however, is often hot enough to set fire to wood, and even to green trees. Dr. James Hector, Director of the Geological Survey of New Zealand, says that the dust ejected from the volcano of Tarawera in June, 1886, was "so hot as to set fire to trees, the stumps of which were seen burning in many places." *

If there was any flame, or any great explosion of inflammable gas in the lateral cloud-discharge that swept down on St. Pierre, it could hardly have escaped the notice of Father Mary, Messrs. Simonut and Lassère, Mr. Guirouard, Mr. Fernand Clerc, Engineer Evans, and Mr. Montera—seven educated and intelligent observers, who were watching the eruption from Morne Rouge, the Grande Réduit, Mont Parnasse, the deck of the Roraima, and the bridge of the Pouyer Quartier. I shall therefore dismiss all stories of flame and explosions of inflammable gas as unworthy of serious consideration, for the reason that they do not seem to

* Preliminary Report to the Government, *Nature*, Vol. 34, p. 389.

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be adequately supported by credible testimony, and for the further reason that all the results of the eruption may be satisfactorily accounted for without assuming the existence of flame or gaseous explosions in the volcanic cloud. The lateral discharge was hot, just as the simultaneous discharge from the main crater was hot, and for the same reason; but there was no flame in the one or the other.

As a means of accounting for the great destruction of life in St. Pierre, it has been supposed—or perhaps I should say conjectured—that the hurricane-cloud contained asphyxiating as well as inflammable gases; but this supposition seems to me no better supported than the other.

Messrs. Lassère and Simonut, who were struck by the blast on the Grande Réduit; Evans and Morris, the second and fourth engineers of the Roraima; Franceso d'Angelo, Giuseppe Suzino, and Salvatore Avello, Italian sailors on the Roraima; and Auguste Ciparis, the prisoner in the dungeon of the city jail, all declare that they were not choked by gas, and that they smelled nothing unusual except a slight sulphurous odor which

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seemed to come from the ashes. Ciparis insists that he smelled nothing whatever ; and Evans and Morris say that while the blast lasted it was too hot to breathe much, and that immediately afterward there seemed to be nothing that they *could* breathe, and they gasped as if in a vacuum, without being able to get anything that satisfied the lungs.

Upon a careful review of all the trustworthy evidence that we were able to get, it seems to me probable that the volcanic discharge which destroyed St. Pierre came from a lateral fissure near the summit of the mountain ; that it did not contain any considerable amount of inflammable gas ; that it did not burst into flame ; and that it did not cause death by asphyxiation. What, then, was its nature, and by what proximate means did it produce the observed effects ?

The best modern authorities—Geikie, Dana, Palmieri, Mallet, and others—agree that explosive volcanic eruptions are due to the rising, in the chimney of the volcano, of a column of molten rock or lava, densely charged with steam, or with the dissociated gases of which water is composed. The steam

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in this lava-column is under enormous pressure, and is prevented from expanding only by the unyielding walls of the chimney within which it is confined. As the lava-column rises in the chimney, it comes at last to a place where the weight of the rocks in the throat of the choked-up vent above, or the resistance offered by the sides of the narrowing cone, is less than the expansive force of the imprisoned steam. The cone then gives way at its weakest point—generally at the summit-crater, where it has given way in earlier eruptions—and the superheated steam, suddenly released from pressure, explodes with tremendous violence, blowing into fine dust the molten rock which holds it, and finally escaping, with the dust, in a hot blast which goes upward through the crater, or out laterally through a fissure, like the discharge from a colossal gun.*

* “Whatever may be its source, we cannot doubt that to the enormous expansive force of superheated water (or its component gases dissociated by the high temperature) in the molten magma at the roots of volcanoes, the explosions of a crater and the subsequent rise of a lava-column are mainly due. The water or gas dissolved in the lava is retained there by the enormous overlying pressure of the lava-column ; but

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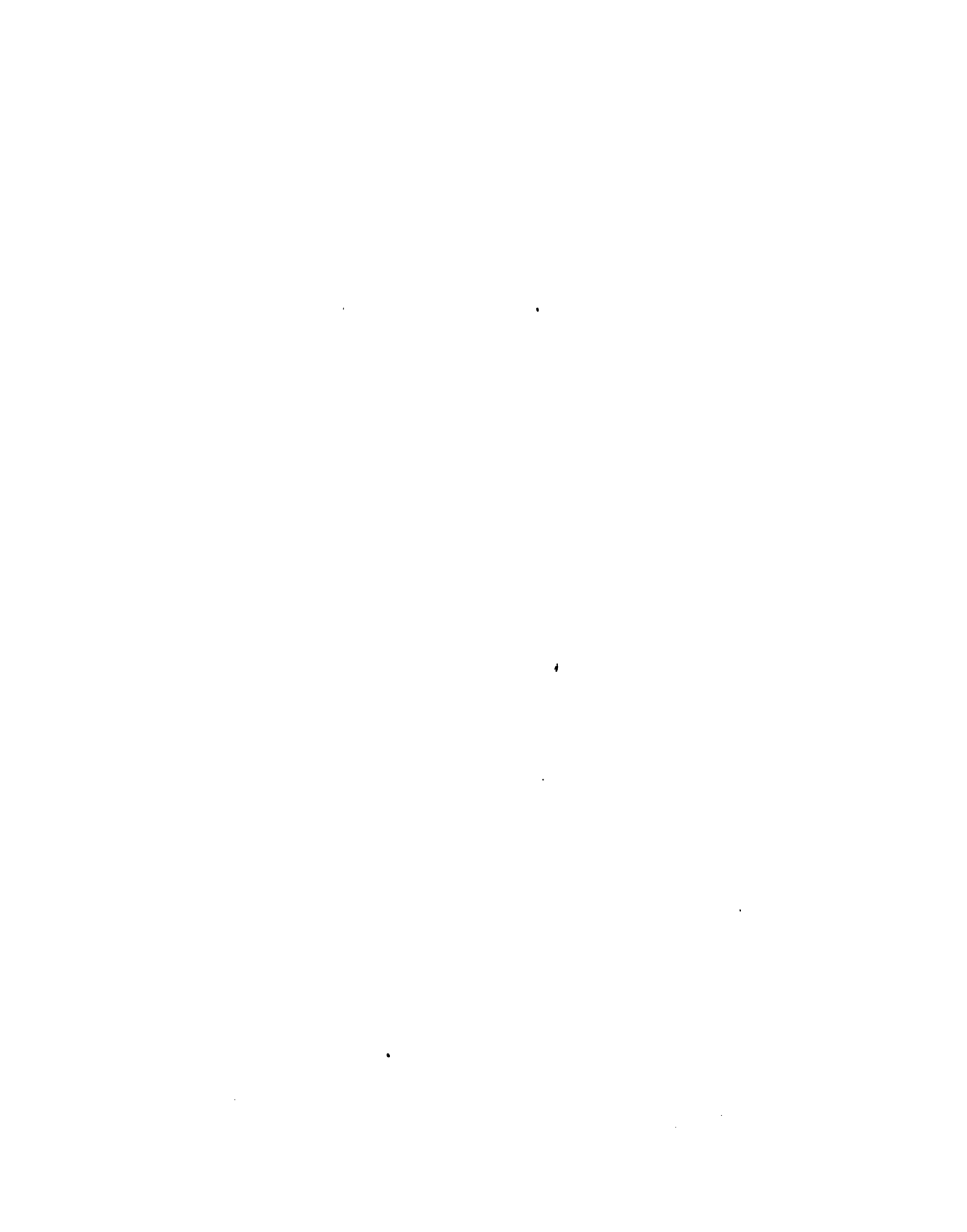
This, it seems to me, is what happened in Martinique on the 8th of May. The expansive force of the steam dissolved in the lava-column was so great that it not only exploded upward through the main crater, but blew out a part of the mountain side, and projected, through the fissure thus formed, a lateral discharge of superheated steam and molten lava dust which swept the southwestern face of the volcano like a red-hot hurricane. The weight of the dust carried by the steam, and perhaps at first the density of the steam itself, had a tendency to depress the blast, so that it followed the slope

when the molten material is brought up to the surface, the pressure is relieved and the water vaporizes and escapes. . . . Where the relief is sudden and extreme, the escape of the water-vapor may be by an explosive discharge."

"The aqueous vapor, which is so largely dissolved in many lavas, must exist in the lava-column under an enormous pressure at a temperature far above its critical point—even at a white heat—and therefore possibly in a state of dissociation. The sudden ascent of lava so constituted relieves the pressure rapidly, without sensibly affecting the temperature of the mass. Consequently, the white-hot vapors at length explode and reduce the molten mass to the finest powder, like water shot out of a gun."—"Text-Book of Geology," by Sir Archibald Geikie, pp. 215, 266. New York, 1893.

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of the mountain down, almost as if it had been a liquid. According to the estimate of Mr. Fernand Clerc, upon which I place most reliance, it went from the fissure to the sea in a period of time that was not less than two nor more than three minutes, or at an average speed-rate of from ninety to one hundred and thirty-five miles an hour. The temperature of the molten rock when the bursting expansion of the steam that it contained blew it into fine dust was probably above 2,000° Fahrenheit; but the blast cooled rapidly in its four-mile course to the sea, and when it struck St. Pierre the steam was not hot enough to kill instantly, although it scalded flesh under clothing, and the dust was not hot enough to burn everything, although it set fire to objects of a particularly inflammable nature. As there were no closed windows in St. Pierre houses (and the windows would have been blown in even if they had been closed), the dust rushed into all the interiors, and found inflammable objects in almost every apartment. This was probably the reason for the sudden bursting into flame of the whole city. The houses took fire



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from the inside, not the outside, and the hot dust may have ignited half a dozen light, inflammable objects in every room.

All survivors of the catastrophe agree that the intensely hot blast was of very brief duration, and their statements are confirmed by the uncooked breadfruits and the scorched but living plants in pots that we found in the ruins of the city. If the blast, which was hot enough to destroy human life and set fire to buildings, had lasted ten minutes—or even five minutes—it certainly would have shriveled up young breadfruits that were fully exposed to it, and would probably have burned the fleshy stems of cactus-like plants so deeply that they could not have thrown out afterward the fresh green shoots that we saw.

That the lateral discharge contained gases other than the vapor of water is quite probable ; but such cases must have been in very small quantities, and they played no part, I think, in the work of destruction. Steam forms at least ninety-nine per cent. of all vaporous discharges from active volcanoes, and it probably formed as great a part as that of

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the lateral discharge from Mont Pelée.* The fact that volcanoes in general throw out immense quantities of steam, mixed with a very small quantity of other gas, made it antecedently improbable that Mont Pelée would suddenly reverse the proportions by ejecting an immense volume of inflammable gas, mixed with only a small volume of steam. There is no trustworthy evidence, moreover, that it did do so.

If there had been any explosion of gas in the air on the southwestern face of the mountain, and if this had been the cause of the destruction, trees would have been blown down

* "Steam has been estimated to form nine hundred and ninety-nine one-thousandths of the whole cloud which hangs over an active volcano."—Geikie's "Text-Book of Geology," p. 193.

"The vapors which are emitted by the liquid lava of the volcano are at least ninety-nine per cent. steam, or vapor of water."—"Characteristics of Volcanoes," by James D. Dana, pp. 7-8. N. Y., 1890.

"St. Clair Deville and Fouqué have shown that the gaseous ejections, of which steam forms probably ninety-nine per cent., are such as rise from water admitted to a pre-existent focus of high temperature."—Robert Mallet, in introduction to "The Eruption of Vesuvius in 1872," by Professor Luigi Palmieri. London, 1873.

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radially on all sides of the center of explosion—westward on the western side, and eastward on the eastern side ; but such was not the case. In St. Pierre, in the valley of the Roxelane, on the edge of the Grande Réduit, and on the arête between the Rivière des Pères and Rivière Sèche, the trees all lie with their heads directly away from a point near the summit of the volcano, between the Étang Sec and the main crater.

It has been urged in support of the gas-explosion theory that the destruction observed is too great to have been caused by a blast originating so far away as the Étang Sec, or even so far away as the lower crater ; and that, consequently, it must have resulted from a gaseous explosion in the erupted cloud at a point in the air that was much nearer. This argument, however, seems to me to have little force. An accidental explosion of 183 tons of gunpowder, at Toulon, France, in March, 1889, caused a lateral blast which carried stones to a distance of two miles and a half, blew in doors and windows at a distance of four miles and a third, and produced a perceptible shock at a distance of fifty miles ; and

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yet the force exerted by the most powerful explosive that man can make is insignificant in comparison with the energy exhibited by such a volcano as Mont Pelée.*

But in the history of volcanic eruptions there are other cases where lateral discharges of superheated steam and hot dust have produced all the effects observed in Martinique. The eruption of the Japanese volcano Bandaisan, in 1888, was like the recent eruption of Mont Pelée in almost every particular, including horizontal blast, hot dust, darkness, mud-rain, demolished houses, burned people, and whole forests of overturned trees. The explosion, or series of explosions, tore off a portion of the side wall of the old crater; loosened an immense mass of rock, which fell in an avalanche upon the lower slopes of the mountain; and liberated a blast of superheated steam and dust which swept, like "a

* *Engineering* (London), May 26, 1899. See also the description given by J. F. H. Herschel of the blast at Dover, England, January 26, 1843, where eight tons of gunpowder blew out of the side of a cliff 400,000 cubic yards of rock, weighing 2,000,000 tons, and scattered the fragments to an average depth of fourteen feet over an area of eighteen acres.—*Journal of the Franklin Institute*, Vol. 35, p. 270.

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hurricane of hot ashes," over the adjacent country, blowing down forests, and destroying, at a distance of two miles and three-quarters, the villages of Shibutani, Shirokijo, and Ojigakura. Mr. Y. Wada, of the Imperial Meteorological Observatory at Tokyo, says that the hot blast which swept through the Biwa-sawa valley had a velocity of not less than ninety miles an hour; and the Japanese geologists, Sikiya and Kikuchi, who have made an admirable report upon the eruption, say that the "heated blasts of steam and air, mixed with dust and rock fragments, were fierce enough to crush trees and to strip them not only of their branches, but even of their bark—withering, scoring, and scorching everything in their track."

The destruction in this case was due, the Japanese geologists say, not to explosions of inflammable gas, but to "the sudden radial expansion of the liberated volumes of steam. The eruption of Bandai-san may be aptly compared to the firing of a tremendous gun—such a one, however, as can only be forged by Nature."

Four hundred and sixty people were burned

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to death, or otherwise killed, in the eruption of the Japanese volcano, but the comparatively small loss of life was due to the fact that the part of the country where the catastrophe occurred was thinly populated. If there had been a city of thirty thousand inhabitants in the Biwa-sawa valley, it would probably have been destroyed by the hot blast from Bandai-san, exactly as St. Pierre was destroyed by the hot blast from Mont Pelée.*

As I have been forced to give to the phenomena of the Martinique eruption an explanation that differs in some respects from that given by most of the American geologists who visited the island, I am glad to find myself supported, in part, by one of the leading scientific men in the West Indies—Dr. Nicholls, C.M.G., of Dominica. In a letter written May 29 to Sir W. T. Thiselton-Dyer, Dr. Nicholls said: "It would appear that a sudden fissure was opened on

* "The Eruption of Bandai-san," by S. Sikiya, Professor of Seismology, and Y. Kikuchi, Professor of Geology, in the Imperial University of Tokyo.—*Journal of the College of Science*, Imperial University, Vol. III., Part 2. Tokyo, 1889.

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the side of the mountain overlooking the city, and near the Étang Sec. On this flank of the mountain a large vent belched out lava, superheated steam, and acid gases downward, on to St. Pierre and the roadstead. The flashing off into steam of the water imprisoned in the incandescent lava converted that lava into sand and dust before it reached the city ; and the radiation of heat from the molten rock, at a temperature of above 1,000° Centigrade, caused an incredibly hot blast that would create a red-hot hurricane—if I may employ such a term—that would kill people and animals instantly, and that would cause all inflammable matter to burst into flame. This, from what I gather, is what really happened ; and I do not think that poisonous gases or electrical phenomena are accountable for the destruction of life. You can imagine what is the enormous heat right over the vent of an active volcano. Well, St. Pierre, practically, for a short time, was in such a position, the vent being directed laterally toward the city.” *

* *Nature* (London), June 26, 1902

THE TRAGEDY OF PELÉE

This explanation of the catastrophe is brief, but it seems to me to account satisfactorily for all the effects produced and all the observed phenomena for which there is trustworthy testimony.

When we returned to Fort de France, after our trip up the western coast of the island on the tug Rubis, we thought that we should see no more eruptions of Mont Pelée; but just before we sailed for New York, the volcano gave us a final exhibition of its majesty and power. Friday morning, a little after ten o'clock, as I sat in my room writing, I heard the voice of Mr. Jaccaci calling to me in an excited way from the lower landing; and as I rushed to my open door, he shouted: "Look at the volcano! There's another big eruption!" Mont Pelée was hidden from our point of view by the intervening peaks of Carbet; but over those peaks, at a height of two or three miles, I saw advancing, with extraordinary rapidity, the sun-illuminated edge of a great volcanic cloud, which had been formed evidently by the mushrooming out of an immense column of dust-charged vapor from the main crater. When I first caught

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sight of it, it covered about half of the northern sky ; but it moved with such rapidity that in less than five minutes it passed the zenith, eclipsed the sun, and threw a dark shadow over all the country between us and the Carbet peaks. It looked, in some respects, like the black canopy of a midsummer thunderstorm ; but it was higher—two or three times as high, apparently, as the trade-wind clouds that drifted diagonally across it a mile above our heads. In order to get a better view, we left the hotel and walked westward through the “Savane” to the sea-beach, where our attention was immediately attracted to a rhythmical inrush and outflow of the sea. Every four or five minutes the water would recede, leaving the slope of the submerged beach exposed for a distance of thirty or forty feet. Then it would come back, like a swift tide, completely covering the whole beach and flooding even the gutters in the streets. The vertical height of the oscillations, from low ebb to full flood, seemed to be about five feet. There were no perceptible earth-tremors, and we could explain the phenomenon only by supposing that great quantities of water and mud had rushed

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suddenly into the sea from the western slope of the volcano. This may or may not account for the oscillations ; but it is certain that every great eruption of Mont Pelée since the 8th of May has been attended or followed by small tidal waves of this kind, and no earthquake shock has been observed at any point on the coast.

After the volcanic cloud passed the zenith—fifteen miles and a half from the crater—it lost its rapidity of motion ; but it continued to extend southward until it covered all of the sky except a narrow strip just above the horizon in the northeast, and another similar strip in the south. It then overshadowed the whole of Martinique and probably had a diameter of seventy-five or eighty miles. It certainly showered ashes on the island of St. Lucia, and caused such darkness at Castries that the Royal Mail steamer had to use a search-light in groping her way into the harbor. In Fort de France there was no fall of ashes and the darkness was like that of a total eclipse. The sky to the westward was intensely black, and the water of the ocean under it looked like dark green marble

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streaked with veins of malachite. On this blackish-green sea, and under that hurricane cloud, all lighter colors, and especially white, assumed extraordinary vividness and brilliancy. The dull red of the harbor buoys became bright scarlet, the dirty spritsails of a few small fishing boats looked like squares of snow, and the sides of the French cruiser Suchet were so intensely and brilliantly white as to be almost dazzling. At that time there was no direct sunshine, and all the light we had came from the narrow strip of uncovered sky along the northeastern horizon.

The gloom lasted about three hours. At one o'clock in the afternoon the volcanic cloud began to drift slowly westward; at three o'clock the sun was shining dimly in an atmosphere filled with smoky haze; and two hours later there remained only a bank of dark vapor, resting apparently on the ocean off St. Pierre and Prêcheur.

This was the last eruption of the great Martinique volcano that we witnessed. Three days later we sailed on the Quebec liner Fontabelle for New York.



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